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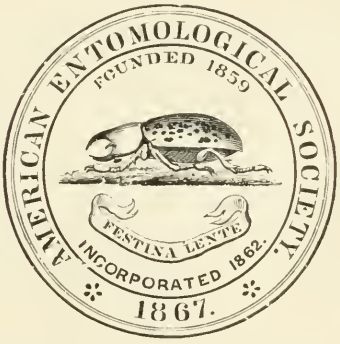

VOL. XXVIII.

HALL OF THE ACADEMY OF NATURAL
SCIENCES OF PHILADELPHIA,
LOGAN SQUARE.

1902.

SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

PRESS OF
P. C. STOCKHAUSEN,
PHILADELPHIA.

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TRANSACTIONS

OF THE

AMERICAN ENTOMOLOGICAL SOCIETY.

VOLUME XXVIII.

DESCRIPTIONS OF SOME MUTILLA FROM BRAZIL.

BY E. T. CRESSON.

The species described in this paper were collected several years ago in various parts of Brazil by Mr. Herbert H. Smith, and by him placed in my hands for determination. Some of them will doubtless prove to be identical with species already described by Klug, Burmeister, Gerstæcker, Smith and others, as the descriptions given are in many cases too meagre for accurate identification, and a comparison with the types will be necessary in order to settle the matter. I have therefore given a tolerably full description of most of the species, some of which are amazingly alike in general appearance, while differing in characters that appear to be constant, but may, with a larger series of specimens, prove to be only varieties.

Owing to the great dissimilarity of the sexes, it is quite impossible to correlate them without a knowledge of their true relationship, and until this has been ascertained, it seems best to consider them as distinct species, and to treat them accordingly.

Mr. Smith has very kindly furnished me with the following interesting notes on the localities in which he collected, and which will amply explain the habitat given after the description of the species.

"The distribution of the Brazilian Mutillidæ is interesting because they seem to be almost confined to the more or less open lands called *campo*. This word requires an explanation.

"The country people distinguish various kinds of land by their vegetation; but, excluding the river bottoms, swamps and seashore, the whole of Brazil may be broadly divided into true forest and campo. The plants and animals of each vary to some extent,

according to latitude and situation; but everywhere the two are sharply defined, and the forest species are nearly all different from those of the campo. The forest is a thick growth of high trees, with a tangle of woody vines, so matted that a knife must be used continually in passing through it. Few of the trees have deciduous leaves; sunlight only reaches the ground here and there; the grasses, where they occur, are arboreal or climbing species; and instead of the ordinary herbaceous plants the ground is often covered with ferns.

"The campo land may be quite open, or with scattered low trees and clumps of bushes. Sometimes these are thick enough to form a kind of pseudo-forest; but even in such places the sunlight reaches the ground freely, and there is always a growth of herbs and grasses; no large, woody vines are seen, and one can walk or ride freely almost anywhere. The trees are gnarled and crooked, and most of them shed their leaves in the dry season; at that time the grass is burned off by the herdsmen. The impression is almost irresistible that this is an old, worn-out vegetation; a plant world in its decrepitude.

"Forest and campo are intermingled; generally the forest lines the banks of rivers and streams; little patches, often of only a few acres, are seen in damp hollows; and steep hillsides are often covered with it. Sometimes forest spreads over level ground, precisely similar in soil and character to the campo, and rising from it like a wall. Very old forest trees do not occur close to the campo; it is evident that the forest is gradually encroaching on the open land, young trees springing up in the shade of the old ones, so that the forest wall must advance very slowly.

"Campo land, almost exactly like that of the plateau, occurs at intervals on both sides of the lower Amazons. I believe, in fact, that the extent of the Amazonian forest has been overestimated. Travel in that region is almost confined to the rivers, and explorers, seeing only the forest lined bank, jump to the conclusion that the whole region is like it. The Amazonian forests are more extensive, because they are favored by the heavy rain falls; but I have information from Indians and others which leads me to suppose that much of the land between the lower Amazonian tributaries is campo. If this view is correct, the campo extends—with little interruption—from Paraguay to the Amazons and beyond it to Guiana; apparently there is similar land beyond the Paraguay—in Bolivia.

"Von Ihering and others have recently called attention to the dual character of the Brazilian fauna. Long ago, I arrived at the conclusion that the campo fauna and flora constitute an older and to some extent decadent set, which is gradually being overrun by the forest. Many of the campo animals are older types, found in the Tertiary; I may mention the Armadilloes and Ostriches. The strange Coleopter, *Hypocephalus*, is a campo insect, and Le Conte* arrived at the conclusion that it is a very ancient and synthetic type. I might multiply such examples, but enough has been said to show the great interest of the subject.

"It is then a fact of peculiar significance that the Mutillidæ are almost exclusively campo insects; they are never common in extensive forest regions (e. g. the Brazilian coast range). Sometimes they are seen on open and dry forest roads, or in clearings; but in such cases they are evidently wanderers from the open lands. Possibly there are some true forest species, but if so I do not know them. The Mutillidæ are abundant all over the plateau, and in open places along the lower Amazons; probably the sandy soil is favorable to them. The females run about on the ground, rather slowly, and are conspicuous on account of their bright colors; they sting severely, but (as with the Pompilidæ) the inflamation soon subsides, leaving only a persistent numbness. It is the rarest thing to find males and females together; the males occur on the ground, sometimes on flowering plants; they fly heavily and slowly. The females are often found digging holes in the sand, and I have seen them carrying small spiders, no doubt to provision the nests.

"A few *Mutilla* from Minas Geraes were given to me by my friend Sr. Carvalho, of Rio de Janeiro. All the others were collected by myself or my assistants.

"Following is a list of the localities; the name of the State is added in parenthesis:

"**Benevides** (Pará), 15 or 20 miles south of Pará, on low, sandy land like that near the city; forest with clearings and open roads, but there is campo land within a few miles. The specimens were collected along roads in sunny places.

"**Chapada** (Matto Grosso), is 25 miles northeast of Cuyabá, on the plateau, approximately 2500 ft. above the sea, but many of the insects were collected as low as 1500 ft. The land is partly sandy and

* On the Affinities of *Hypocephalus*, Trans. Am. Ent. Soc., v, 1876, pp. 209–218.

more or less open campo, interspersed with tracts of forest. Nearly all the Mutillidæ were collected on sandy campo land, whether the label states the fact or not.

"**Corumbá** (Matto Grosso), is on the west side of the River Paraguay. The land is a very dry, calcareous soil, with a scrubby growth full of cacti and other thorny plants. True forest is found some miles back at Piedra Blanca.

"**Mararú** (Pará), 6 miles south of Santarem, a clearing in the forest; soil sandy. There is campo land less than two miles away, and some of the Mutillidæ may have been collected on it.

"**Minas, Car.**—This label is placed on a number of specimens from Minas Geraes, which were given to me by Sr. Carvalho, of Rio de Janeiro.

"**Pará** (Pará), on the Pará River, properly the enlarged mouth of the Tocantins. The site of the city was originally covered with dense forest, but it is now more or less cleared for several miles around; soil sandy. True campo land occurs within twenty miles to the south.

"**Paracary** (Pará), on the north side of the Amazons, nearly opposite Santarem, on a lake which lies in the Amazonian floodplain. The land back of the lake is sandy campo, very similar to that at Santarem and Chapada.

"**Piedra Blanca**, or in Portuguese, **Pedra Branca**, is 5 miles west of Corumbá, and just within the confines of Bolivia. The land here is heavy forest, with clearings; but it is quite close to the scrubby growth surrounding Corumbá.

"**Rio de Janeiro.**—In the region of the Brazilian Coast Range; the mountain sides were originally covered with forest, but there was more or less open and arid land near the seashore and among rocks.

"**San Salvador** (Pernambuco), a plantation 30 miles inland from the city of Pernambuco, and not over 500 ft. above sea-level; sandy soil with open forest.

"**Santarem** (Pará), on the River Tapajós, just above its mouth in the Amazon. The land immediately about the town is sandy campo; the forest limit is three or four miles south.

"**St. Catherina** (Santa Catherina).—The specimens so labelled were collected near the town of Santa Catherina, on an island of the same name, close to the coast. The island was originally covered with forest, but has been cleared near the town.

"**Sao Joao do Monte Negro** (Rio Grande do Sul), on the River Cahy, 40 miles north of Porto Alegre. Low land, forest, with numerous clearings. There are open lands two miles south, continuous with the pampas of Uruguay."

FEMALES.

The following summary of the more detailed table which follows, will assist in locating the species characterized therein:

Abdomen crested or tuberculate at base of second segment.....Species 1–4.
Abdomen not so crested or tuberculate.....2.
2. Thorax more or less ferruginous.
Eyes ovate, depressed.
Basal segment of abdomen broadly dilated at apex.....Species 5–16.
Basal segment quadrate, or nodose, or subnodose at apex....Species 17–20.
Eyes rounded, very convex.....Species 21–22.
Thorax black, generally with pale pubescent markings.....3.
3. Second segment of abdomen with pale pubescent markings.....4.
Second segment with yellow or red smooth or punctured spots.....5.
Second segment with smooth yellow band at apex.....Species 87–88.
Second segment with two smooth yellow stripes.....Species 89–91.
4. Head unusually large.....Species 23–32.
Head not unusually large.....Species 33–41.
5. Second segment of abdomen with *two* red or yellow spots.....6.
Second segment with *four* red or yellow spots.....7.
6. Head large, broader than thorax.....Species 42–48.
Head of usual size, not broader than thorax.....Species 49–61.
7. Thorax prominently toothed laterally.....Species 62, 63, 77.
Thorax not prominently toothed laterally.....8.
8. Thorax black on anterior half, metathorax golden with central black stripe. Species 64.
Thorax black, with central pale pubescent stripe.....Species 65.
Thorax with two silvery pubescent stripes, sometimes entire, but generally more or less abbreviated anteriorly.....Species 66–76, 78–86.

This last division contains species (or in some cases possibly only varieties of species) which closely resemble each other in general ornamentation, and additional tables to assist in separating them, will be found further on under species Nos. 75 and 86.

Table of Species.

Second segment of abdomen crested or tuberculate at base.....2.
Second segment not crested or tuberculate.....5.
2. Thorax more or less ferruginous or yellowish.....3.
Thorax black.....4.

3. Honey-yellow; head yellowish; the tuberculated crests at base of second segment of abdomen prominent and black.....1. **denticulata** Sm.
Head and abdomen, except first segment, black; base of second segment with two groups of tubercles divided by a short longitudinal white pubescent line.....2. **cornigera** Cress.
4. Second segment of abdomen at base above with two elevated, oblique, dentated crests; this segment honey-yellow above with a black X-shaped mark covering the crests and confluent posteriorly on apical margin; metathorax densely clothed with pale golden pubescence, lateral margins with small short teeth.....3. **decussata** Cress.
Second segment above black, with a triangular patch of depressed tubercles on each side at base, a ferruginous spot between these and a large rounded spot of same color on each side posteriorly, separated by a slender black line; metathorax black, the lateral margins with large acute teeth, directed backward; spine at tip of posterior tibiæ long and thickened at base.....4. **iracunda** Cress.
5. Thorax more or less ferruginous or yellowish.....6.
Thorax black, ornamented more or less with pale pubescence, rarely entirely black.....20.
6. First segment of abdomen broadly dilated at apex and conforming in outline with base of second segment; eyes ovate, depressed, distinctly netted..7.
First segment narrow, subquadrate, not or but slightly dilated at apex....15.
7. Thorax broad, subquadrate, not narrowed medially, the disk only red; abdomen black, with two silvery pubescent stripes, interrupted at apex of second segment by a silvery band.....5. **seducta** Cress.
Thorax rather narrow, elongate, subcompressed, slightly narrowed medially, almost entirely ferruginous.....8.
Thorax short, fiddle-shaped, being more or less deeply constricted laterally before metathorax; eyes rounded, very convex, polished.....9.
8. Abdomen black above, with two slender silvery pubescent stripes, interrupted by a narrow silvery band at apex of second segment.
6. **phalerata** Klug.
Abdomen with two silvery stripes, each of which is dilated into a spot at apex of second segment, before which the stripes are narrowed and subinterrupted; first segment, venter and base of antennæ ferruginous.
7. **exclamationis** Cress.
9. Abdomen black above, with a central silvery pubescent stripe from base to apex, and a triangular silvery spot on each side of second segment.
8. **dividua** Cress.
Abdomen black above, with a more or less distinct silvery band on second segment; head and legs black or brown; thorax entirely red.....10.
Abdomen with second segment above black or fuscous, with two pale spots..11.
10. Head above with an arcuate silvery pubescent band; apical margin of abdominal segments fringed with silvery pubescence; no red color on second segment.....9. **credula** Cress.
Head above entirely black, the pale band on second segment of abdomen narrowed medially and red beneath the pale pubescence; a broad band of pale golden or silvery pubescence on segments 3-5.
10. **crepera** Cress.

11. Head black, with black pubescence.....12.
Head black, with golden pubescence; thorax ferruginous, with two fuscous spots on anterior margin of mesothorax; legs rufo-testaceous; the spots on second abdominal segment round, reddish and covered with silvery pubescence; a large silvery pubescent spot on middle of remaining segments; basal segment ferruginous...11. **paulula** Cress.
Head above honey-yellow or testaceous.....14.
12. Second segment of abdomen above with two large broad lunate testaceous spots.....13.
Second segment with two slender lunate testaceous spots or lines, dilated posteriorly; thorax honey-yellow, with anterior margin of mesothorax black; legs honey-yellow varied with fuscous; head black, with indistinct pale spot between eyes; antennæ fusco-testaceous.
12. **parata** Cress.
13. Antennæ, collar and middle of anterior margin of mesothorax black; the two spines on each side of thorax before constriction unequal, the anterior one much larger and directed backward; form stout.
13. **bilunata** Burm.
Antennæ at base, collar and thorax entirely, pale honey-yellow; the two spines on each side of thorax before constriction small and equal in length.....14. **pergrata** Cress.
14. Second segment of abdomen above black, with two broad sublunate testaceous spots.....15. **pacata** Cress.
Second segment above black, with two oblong ovate pale golden spots.
16. **tantula** Cress.
15. Second segment of abdomen above black, with pubescent markings.....16.
Second segment above black, with two reddish or yellowish punctured spots.....19.
16. Head black, with black pubescence; thorax, legs, first segment of abdomen and venter fulvo-testaceous; two patches of thin pale pubescence near base of second segment, its lateral and apical margins and remaining segments with golden pubescence.....17. **Januarii** Dalla Torra.
Head rather densely clothed with golden pubescence.....17.
17. Abdomen above black, with two silvery stripes on second and following segments; thorax entirely dull red; legs fuscous...18. **invitata** Cress.
Abdomen above clothed more or less with dense appressed golden-ochraceous pubescence; second segment black, varied with golden-ochraceous, the basal middle and disk always black; thorax with two more or less distinct blackish stripes.....18.
18. Third and following segments of abdomen broadly blackish on each side.
19. **benevola** Cress.
Third and following segments covered entirely with golden-ochraceous pubescence, except a reddish brown spot on apical middle of segments 2 5: small species.....20. **beatula** Cress.
19. Abdomen with the two spots on second segment oblong and subapical; head with golden pubescence.....21. **integella** Cress.
Abdomen with the two spots broad, elongate and reaching the basal margin of the segment, where it is narrowed; head with silvery pubescence.
22. **verecunda** Cress.

20. Second segment of abdomen black, ornamented with silvery, golden or cupreous pubescent markings.....21.
Second segment black, with two or four smooth or punctured and shining or opaque spots.....35.
Second segment black, with a narrow, smooth, polished yellow band at apex.....74.
Second segment black, with two smooth, polished yellow stripes.....75.
21. Head unusually large, quadrate or subquadrate, as large or larger than the thorax and broader; space behind eyes very long, posterior angles of head more or less acutely carinate.....22.
Head not unusually large, not as large as thorax and not or rarely broader...29.
22. Head toothed beneath.....24.
Head not toothed beneath.....23.
23. Head black, with pale pubescent stripe behind each eye; antennæ and legs black; second segment of abdomen above with a median pale golden stripe, continued on first segment, but abbreviated posteriorly, and a transverse spot of same color on each side behind middle; two entire silvery pubescent stripes on thorax; form robust..23. **harpyia** Gerst.
Head golden pubescent; antennæ, first segment of abdomen and legs ferruginous; first and second segments broadly pale golden on apical middle, continued narrowly on lateral margin; two abbreviated silvery stripes on thorax; form not robust.....24. **vera** Cress.
24. Second segment of abdomen above with a discal spot of cupreous, golden or silvery pubescence.....25.
Second segment with a pale ochraceous spot on apical middle, continued in a slender stripe to apex of abdomen; first segment with a discal ochraceous spot.....28.
25. Head entirely black above.....26.
Head black, with two silvery or golden pubescent spots or lines behind the eyes.....27.
26. Discal spot on second segment of abdomen above rounded and cupreous; metathorax with two pale golden pubescent stripes, extending a short distance on mesothorax; cheeks beneath with a long acute tooth on each side.....25. **cephalotes** Swed.
Discal spot on second segment rounded and golden cupreous; two spots on mesothorax, two on metathorax at base, and two indistinct spots on vertex, pale golden pubescent; head beneath posteriorly with an acute tooth, the posterior margin above acutely carinate.
26. **specularis** Gerst.
Discal spot on second segment much smaller, oblong-ovate and golden; thorax above entirely black; head beneath with two long, widely separated, subacute teeth, and a small tooth on cheeks beneath; posterior angles of cheeks produced into a sharply compressed tooth.
27. **spiniceps** Cress.
27. Discal spot on second segment longitudinally ovate and cupreous; sides of third segment and spot behind each eye, silvery pubescent; head beneath with two median approximate teeth, and a shorter tooth on cheeks beneath; clypens with a long narrow, median, flattened projection, bidentate at tip; posterior angles of head, when viewed from above, acute.....28. **centromaculata** Cress.

Discal spot on second segment subtriangular and golden; the apical segments with two silvery stripes; cheeks armed beneath with a stout tooth; posterior angles of head rounded, a silvery pubescent stripe behind each eye.....29. **Smithii** Cress.

Discal spot on second segment small, longitudinal and silvery; spot on each side of head behind eyes, and spot on each side of third abdominal segment, silvery pubescent; head beneath with two long acute divergent teeth, and a short tooth on cheeks beneath; posterior angles of checks carinate and produced into a prominent, compressed, obtuse tooth.....30. **armata** Klug.

28. Thorax above with a pale ochraceous pubescent median stripe, sometimes interrupted into spots, and a slender pale stripe on each side of metathorax; head with an oblique pale line behind each eye; a stripe on lateral margin of second abdominal segment, not reaching apex, and sides of remaining segments, white or pale ochraceous; a pale spot on apical middle of second segment, dilated and more or less triangular; cheeks toothed beneath; form robust.

31 **bucephala** Perty.

Thorax above with sides only—mesothorax narrowly, and metathorax broadly—silvery pubescent; second abdominal segment with a triangular silvery spot on each side at apex; head with a golden stripe behind each eye (sometimes entirely black or golden); cheeks with a small tooth beneath near base of mandibles; frontal tubercles very prominent.....32. **victura** Cress.

29. Eyes small, round, convex, polished.....30.

Eyes ovate, depressed, distinctly netted.....33.

30. Head quadrate, distance behind eyes long; second segment of abdomen with two narrow, elongate spots of pale ochraceous pubescence on disk; sides of first, lateral margin of second, sides of third and following segments, also two stripes on vertex and on metathorax, also pale ochraceous or silvery pubescent.....33. **gigantea** Perty.

Head small, transverse, distance between the eyes short.....31.

31. Mesothorax twice notched or constricted on each side, with a prominent obtuse tooth between the constrictions; anterior angles of thorax with a short obtuse polished tubercle; head, thorax and abdomen variously ornamented with pale ochraceous or white pubescence.

34 **cerbera** Klug.

Mesothorax not constricted laterally, unarmed.....32.

32. Thorax with two entire pale pubescent stripes..36. **Gazaguairei** André.

Thorax with only one pale stripe.....35. **centrovittata** Cress.

Thorax without pale stripes except on sides of metathorax, where they are silvery; second segment of abdomen with two long, narrow, oblique, silvery white spots of apical half; head silvery white above.

37. **bifurca** Klug.

33. First segment of abdomen broadly dilated at apex, and conforming in outline with base of second segment; head transverse, scarcely broader than thorax, which is short, broad, subquadrate, and not constricted laterally; abdomen black, with a broad, central bright golden or cupreous pubescent stripe on segments 1-3...38. **auroplaga** Cress.

First segment small, quadrate, scarcely dilated at apex; head transversely subquadrate when viewed from above, broader than thorax, which is long, narrow, subcompressed laterally .....34.

34. Metathorax above with a median silvery pubescent stripe; head above with a transversely triangular silvery spot; second segment of abdomen with two small spots on basal middle, and a band on apical margin, interrupted on middle, silvery pubescent.....39. **calvaria** Cress.

Metathorax with a silvery stripe on each side; face and vertex ochraceous; second segment of abdomen with a broad band at apex, interrupted on middle, and two rows of spots on segments 3-5, silvery pubescent. 40. **felix** Cress.

Metathorax entirely silvery, except a black stripe on disk; head entirely black; two large round spots on base of second abdominal segment, and two square spots on apex of segments 2-5, dull golden or cupreous pubescent.....41. **crusa** Cress.

35. Second segment of abdomen with two round or ovate yellow or red spots..36.

Second segment with four spots, those at base generally smaller and elongate, sometimes reduced to mere dots or obsolete.....53.

36. Head large, subquadrate, broader than thorax .....37.

Head of usual size, not broader than thorax.....43.

37. Front of head projecting over the face like an overshoot, the lateral angles of projection prominently toothed; the two ovate reddish spots on second segment opaque.....42. **projectifrons** Cress.

Front of head not projecting, unarmed.....38.

38. First segment of abdomen broadly dilated at apex, and conforming in outline with base of second segment .....39.

First segment not conforming in outline with base of second, but more or less constricted at apex, or small and subquadrate.....42.

39. Pubescence above short and generally velvety black .....40.

Pubescence above long and entirely brownish ochraceous, depressed, almost hiding the silvery stripes on each side of head and thorax, as well as the two small, rounded, shining, yellow spots on second abdominal segment.....46. **bombycina** Cress.

40. Segments of abdomen beyond the second with a median stripe of silvery pubescence.....41.

Segments beyond the second with the sides silvery and the middle black; stripe behind each eye, and on sides of thorax above not reaching anterior margin, silvery pubescent; the two rounded, yellowish spots on second segment punctured; thorax slightly longer than broad. 44. **turnalis** Cress.

41. Spots on second segment of abdomen small, round, yellowish; silvery pubescent stripes on thorax entire.. .....43. **araxa** Cress.

Spots on second segment large, longitudinally ovate, and covered with dense appressed bright cupreous pubescence; the silvery stripes on thorax abbreviated anteriorly; size small .....45. **curiosa** Cress.

42. First segment of abdomen broad and constricted, but not toothed, at apex; head unusually large, depressed, and when viewed from above subtriangular, being broader in front, very long behind eyes, with posterior angles acute; stripe behind eyes and on each side of thorax, spot on disk of first segment and stripe on middle of apical segments, silvery

pubescent; sides of metathorax toothed: the two spots on second segment very large, and nearly confluent, blood-red, opaque.

47. **carinigena** Cress.

First segment constricted to a band at apex, before which is a transverse row of large acute teeth; head large, subglobose, posterior angles rounded; thorax narrowed posteriorly, sides of thorax not toothed; the two spots on second segment small, round, red, smooth and polished.

48. **Pertyi** Dalla Torra.

43. Second segment of abdomen with longitudinal or oblique interrupted rows of carinæ on upper surface; lateral margin of thorax more or less toothed; form robust.....44.

Second segment above more or less densely and deeply punctured; lateral margin of thorax unarmed; form more slender.....49.

44. Apex of abdomen with two silvery pubescent stripes.....45.

Apex of abdomen silvery or golden, with a black median stripe.....47.

45. The two yellowish spots on second segment rounded.....46.

The two yellowish spots narrow transverse; the two slender silvery stripes on thorax above entire or nearly so; form large, robust.

51. **infausta** Cress.

46. Head and thorax black.....49. **stygia** Smith.

Head with spot behind each eye, and two stripes on metathorax extending for a short distance on mesothorax, silvery pubescent; the two spots on second segment yellow or orange.....50. **myops** Burm.

47. The two spots on second segment oblique; two silvery pubescent stripes on head, thorax and basal segment of abdomen.....52. **bellula** Cress.

The two spots rounded or ovate.....48.

48. The two spots on second segment rather small and rounded, yellow; head with silvery pubescent spot behind each eye; spot on each side of mesothorax posteriorly, and two stripes on metathorax, silvery pubescent.....53. **larvata** Klug.

The two spots on second segment very large, ovate, orange-red; head golden between eyes and on face; metathorax golden, with a black median stripe.....54. **spinosa** Swed.

49. Metathorax above with a short, smooth, transverse carina on disk; body and legs with glittering pubescence, giving the insect a frosty appearance; the two spots on second segment very large, pale yellow, margined with brown, densely punctured; apical segments silvery pubescent; small and rather slender species.....55. **frigidula** Cress.

Metathorax without carina on disk above.....50.

50. The two spots on second segment very large, elongate, bright red, reaching anterior margin of segment.....51.

The spots on second segment longitudinally ovate, pale yellow; head and thorax entirely black; apical segments with a short median, silvery stripe.....56. **bellica** Cress.

The spots on second segment rounded, pale yellow; thorax with two silvery pubescent stripes, and apical segments with a median silvery stripe.

57. **diophthalma** Klug.

The spots on second segment more or less tranverse or oblique; thorax with two silvery or pale golden pubescent stripes.....52.

51. Abdomen with a spot of silvery pubescence on disk of first segment and also on apical middle of second; apex of abdomen with pale glittering pubescence: head golden pubescent .....58. **bellicosa** Cress.

Abdomen with apical margin of first segment, and all the segments beyond the second, silvery, with a central black stripe, continuous with that on second segment; head silvery pubescent with a reddish-brown spot on vertex .....59. **bellifera** Cress.

52. Apex of abdomen with a median silvery pubescent spot on segments 2–5; the two spots on second segment more or less oblique, yellow. (See ♀ 59). 60. **latevittata** Cress.

Apex of abdomen with a median silvery spot on segments 4–5 only; the two spots on second segment transversely quadrate, not oblique, generally blood-red. (See ♀ 58).....61. **demissa** Cress.

53. Thorax laterally, at base of mesothorax, with a large, stout obtuse tooth, between which and the prominent tuberculiform metathoracic spiracles is a deep notch.....54.

Thorax not toothed laterally .....56.

54. The spots on second abdominal segment large, rounded or quadrate.....55.

The spots on second segment narrow, linear, those at base longitudinal, those near apex transverse and only slightly separated medially; thorax with two slender silvery pubescent stripes not reaching prothorax. 77. **solemnis** Cress.

55. Entirely black, except the four dull red shining spots on second abdominal segment and a slender silvery pubescent stripe on segments 4–5. 62. **atripes** Smith.

Head and anterior half of thorax black, the posterior half golden pubescent, except a black stripe on middle of metathorax; the four spots on second segment large, irregular in shape, orange-yellow, the basal spots smaller and quadrate.....63. **4-notata** Klug.

56. Thorax black, posterior margin of mesothorax, and metathorax except a median black stripe, golden pubescent, as well as spot on apical sides of segments 2 and 3, and all of segments 4 and 5; the spots on second segment orange red, the subapical ones very large, irregular, those at base much smaller; head entirely black.....64. **inermis** Klug.

Thorax with an entire central stripe of pale ochraceous pubescence; second segment above with two large, rounded, deeply punctured, shining, blood-red spots, and two oblique smaller spots of same color at base nearly confluent with the larger ones; segments 4 and 5 with a square discal spot of pale ochraceous pubescence. 65. **dorsovittata** Cress.

Thorax with two silvery or golden stripes, generally confined to metathorax and base of mesothorax; apex of abdomen with a central silvery stripe, occasionally abbreviated to one or two spots.....57.

57. Head clothed with silvery or griseous pubescence; thoracic vittæ broad and entire .....58.

Head above with a median spot of golden or silvery pubescence.....60.

Head above with a transverse or subarcuate band of silvery pubescence..62.

Head above with two silvery or golden pubescent suborbital stripes.....65.

Head above entirely black.....66.

58. A spot of silvery pubescence on apical middle of abdominal segments 4 and 5 only; the two red basal spots on second segment very small and often wanting. (See ♀ 52).....61. **demissa** Cress.

A spot of silvery pubescence on apical middle of segments 2–5.....59.

59. The two smooth spots on posterior part of second segment of abdomen small, yellow, generally tranverse, often oblique; the two basal spots often very small, and sometimes wanting. (See ♀ 52).

60. **latevittata** Cress.

The two smooth spots large, rounded, blood-red, sometimes almost confluent with the two basal spots, which vary in size, but never minute.

66. **quadrum** Klug.

60. Thoracic vittæ fulvous or dark golden pubescent, almost entire; spot on vertex generally small and sometimes wanting. (See ♀ 67).

67. **chapada** Cress.

Thoracic vittæ pale golden, silvery or griseous, confined to metathorax, or very slightly extended on mesothorax posteriorly..... 61.

61. The silvery pubescent patch on flanks of metathorax broader, extending forward on pleura; the two spots on posterior part of second abdominal segment subquadrate or rounded.....68. **crixa** Cress.

The silvery patch narrow and confined to flanks of metathorax; the two spots on posterior part of second segment more or less transverse.

70. **vagabunda** Smith.

62. The two smooth pale spots on posterior part of second segment square or rounded.....63.

The two smooth spots narrow and very transverse.....64.

63. A spot of silvery pubescence on apical middle of abdominal segments 4 and 5 only.....69. **compar** André.

A spot of silvery pubescence on apical middle of segments 2–5.

71. **spectabilis** Gerst.

64. Thoracic vittæ golden or fulvous pubescent, those on mesothorax broad, curved and attennated anteriorly, almost or quite entire; a silvery-white spot on extreme side of abdominal segments 2 and 3 at apex; ventral segments 2 and 3 banded at apex with pale pubescence.

78. **æmulata** Cress.

Thoracic vittæ narrow and silvery, extended anteriorly on base of mesothorax; a silvery white spot on extreme side of segments 2–4 at apex; ventral segments 2–4 banded at apex with pale pubescence.

76. **indica** Linn.

65. Thoracic vittæ not extended forward on prothorax.

Thorax notched on each side at about the middle.

Mesothoracic vittæ broad, oblique and disconnected at base from the slender metathoracic stripes.....74. **duplicata** Gerst.

Mesothoracic vittæ slender, straight and continuous with the metathoracic stripes.....72. **bivittata** Gerst.

Thorax not notched laterally.....73. **estrella** Cress.

Thoracic vittæ entire; thorax not notched laterally.... 75. **ocellaris** Klug.

66. Head subquadrate, broader than thorax.....79. **vivata** Cress.

Head not broader than thorax, generally narrow.....67.

67. Thoracic vittæ fulvous or dark golden, almost entire; head above often with

a more or less distinct tuft or line of dark golden pubescence. (See ♀ 60).....67. **chapada** Cress.

Thoracic vittæ silvery or griseous.....68.

68. Thoracic vittæ interrupted on mesothorax posteriorly; the smooth spots on posterior part of second segment of abdomen transversely subquadrate; calcaria pale.....80. **graphica** Gerst.

Thoracic vittæ not interrupted.....69.

69. Thorax more or less deeply notched on each side of mesothorax posteriorly, and immediately in front of metathoracic tubercles.....70.

Thorax not or very slightly notched on each side of mesothorax posteriorly; calcaria pale.....73.

70. Thoracic vittæ extending beyond base of prothorax, sometimes nearly reaching its anterior margin.....71.

Thoracic vittæ much abbreviated anteriorly, not extending beyond base of prothorax.....72.

71. Calcaria black or fuscous; the two smooth spots on posterior part of second abdominal segment oblique.....81. **manca** Cress.

Calcaria pale; the two smooth spots subtransversely quadrate.

84. **borba** Cress.

72. Calcaria black or fuscous; the two smooth spots on posterior part of second abdominal segment subquadrate, not oblique.....82. **sodalis** Cress.

Calcaria pale; the two smooth spots more or less oblique, pyriform.

83. **optata** Cress.

73. Second abdominal segment with a silvery pubescent spot on apical middle, the two smooth spots at base ovate; pubescence of legs pale.

86. **auxiliaris** Cress.

Second segment without silvery spot on apical middle, the two smooth spots at base long, sublinear; pubescence of legs, at least on outer side of the four posterior tibiæ and tarsi, mostly black..85. **juvenalis** Gerst.

74. Thorax above with two broad, almost entire, reddish-brown pubescent stripes; two narrow, smooth, longitudinal, yellow spots at base of second abdominal segment; calcaria black.....87. **unimarginata** Cress.

Thorax above with two narrow silvery pubescent stripes, generally no smooth spots at base of second segment; calcaria pale..88. **mundula** Cress.

75. The two stripes on second segment of abdomen straight or nearly so.....76.

The two stripes on second segment curved outwardly on posterior half; thorax with two almost entire silvery pubescent stripes; calcaria pale.

89. **Andrei** Cress.

76. Thorax entirely black; calcaria black or fuscous...90. **rectilineata** André.

Metathorax with two slender silvery pubescent stripes, and a broad silvery pubescent patch on flanks; calcaria pale.....91. **ipanema** Cress.

NOTE.—The types of all the new species described in this paper are in the Carnegie Museum, Pittsburgh, Pa.

1. **M. denticulata** Smith, Brit. Mus. Cat. Hym., iii. p. 48.—♀.—Length 7–8 mm.—Head large, transversely subquadrate, scarcely narrowed posteriorly, broader than thorax; eyes rounded, very convex, smooth, polished; thorax short,

fiddle-shaped, broad in front, constricted laterally at base of metathorax, the anterior angles acutely carinate; two short teeth on each side near base of mesothorax; the stigmatic tubercles at base of metathorax prominent and white; metathorax broad, depressed, lateral margin with five long acute teeth; first segment of abdomen dilated posteriorly, the apical margin slightly constricted; second segment densely sculptured, and on each side at base above a prominent longitudinal dentated crest, and a short longitudinal carina on each extreme side; apical segment convex, smooth and shining.

Honey-yellow, with pale pubescence more or less mixed with blackish; head more or less varied with yellowish; thorax ferruginous, posterior margin of prothorax, a spot on its middle and a spot on base of metathorax, sometimes continued narrowly to apex, and sometimes extended forward on mesothorax, black or fuscous; legs entirely honey-yellow, with pale pubescence; calcaria white; second segment of abdomen more or less yellowish, the crests, and sometimes a stain on sides and lateral apical margin of the segment, black or fuscous.

Santarem. Easily recognized by the pale color, and the two prominent black dentated crests on base of second segment of abdomen.

This is doubtless *denticulata* Smith, although the punctuation is fine, and the denticulated tubercles or crests on second abdominal segment are prominently black; the teeth at sides of metathorax are long, slender and acute.

2. **M. cornigera** ♀.—Length 6.5 mm.—Small, rather slender; head not broader than thorax, subquadrate, depressed, rounded posteriorly and prolonged behind eyes, which are small, rounded, not very convex, polished; thorax ovate, rounded above, slightly narrowed in front, and rapidly so behind, not constricted, the anterior angles tuberculate; metathorax subcompressed, sides not dentate; abdomen ovate, first segment broad posteriorly, sessile with base of second, which is very densely punctured, and on each side at base a group of five or six prominent tubercles.

Black; antennæ, thorax, most of legs and first segment of abdomen, ferruginous; tibiæ, apical segment of abdomen above and venter fuscous; a short stripe at base of second segment above between the groups of tubercles, a narrow band on apical margin, and a spot on disk of segments 3–5, of silvery white pubescense; calcaria pale; apex of abdomen with yellowish pubescence, the ventral segments fringed at apex with white pubescence.

Chapada. One specimen (May). Easily recognized by the tuberculate base of second abdominal segment.

3. **M. decussata** ♀.—Length 10 mm.—Head subquadrate, broader than thorax, slightly narrowed and extending a considerable distance behind the eyes, which are rounded, very convex and polished; cheeks carinate; thorax ovate, not constricted laterally, anterior angles carinate; metathorax short, gradually narrowed posteriorly, the lateral margin with a row of short acute teeth; legs slender; abdomen ovate, first segment nodose, second segment densely punc-

tured, and on each side of disk at base a crest of about six erect obtuse, compressed teeth.

Head, pro- and mesothorax black, with erect black hair; mandibles, base of antennæ, and legs fuscous; metathorax and pleura covered with a fine dense pale golden sericeous pile, and clothed above with long pale erect hair; calcaria white; abdomen at base and sides with long pale erect hair, the second segment, when viewed from above, honey-yellow, with a black X-shaped mark covering the crests and confluent posteriorly on apical margin: third and following segments densely pale golden sericeous, and clothed with erect, pale hair; venter fuscous, with pale glittering pubescence.

Rio de Janeiro. One specimen taken in October. Easily recognized by the crested second segment of the abdomen having a black X-shaped mark.

4. **M. iracunda** ♀.—Length 8 mm.—Head and thorax above densely, coarsely and confluently punctured; head transverse, scarcely broader than thorax, eyes rounded, very prominent, almost globose, smooth and polished; thorax fiddle-shaped; mesothorax with three teeth on each side, one at anterior angle and two near posterior margin; metathorax with four or five acute teeth on lateral margin, the second one large and directed posteriorly; the spine at tip of posterior tibiæ long, porrect, thick at base and abruptly slender at apex; abdomen ovate, about as long as head and thorax together, basal segment broad, depressed, apical margin subconstricted, band-like, with a transverse, subapical row of tubercles or teeth; second segment depressed, and on each side the surface is obliquely elevated, crest-like, covered with subdepressed tubercles, all pointing backward; on each side behind the crest the surface is broadly depressed and densely punctured.

Black, with erect black hair, pale on face and silvery on cheeks; sides of thorax silvery sericeous; the stigmatic tubercles at base of metathorax ferruginous; basal segment of abdomen with silvery hair, a few long black hairs near apical middle, the depressed apical margin silvery; the depressed surface of second segment above ferruginous, opaque, arranged in three large spots, that on basal middle being smallest and subcordate, the other two very large and separated on disk by a narrow black line; third and following segments silvery sericeous; beneath, the second segment is shining, with rather large sparse punctures; calcaria pale.

Santarem. One specimen. A very distinct species, easily recognized by the color and sculpture of the second abdominal segment, which is tuberculate and having three large, opaque, depressed, ferruginous spots.

5. **M. seducta** ♀.—Length 10 mm.—Robust; head transverse, as broad as the thorax, densely and confluently punctured; eyes large, ovate, depressed, distinctly netted; thorax quadrate, rather longer than broad, sides parallel, not narrowed medially, but somewhat sinuate, unarmed, above longitudinally rugose; posterior face of metathorax broadly but not deeply concave, shining, lateral margin serrate; flanks of thorax more or less excavated, smooth, shining and pale sericeous; abdomen broadly ovate, first segment very broad, flattened, sessile

with base of second segment and conforming in outline therewith; apical segment above broad, flat, opaque, longitudinally aciculate.

Black; occiput, cheeks, face beneath antennæ and scape clothed with griseous pubescence; vertex above with two ill-defined spots of pale pubescence; thorax ferruginous above, margined all around with black; legs black, with pale glittering pubescence, that on tibiæ and tarsi golden in certain lights, calcaria whitish; abdomen with short appressed black pubescence on base and sides, mixed with paler hairs; apical sides of first segment, an undulated band, slightly interrupted medially, on apex of second segment, and two stripes beginning at base of second segment and extending to apex of fifth segment, all of silvery pubescence, the stripes on second segment subinterrupted before reaching the band at apex; venter black, the segments fringed at apex with long pale pubescence.

Chapada. One specimen taken in November.

This species is more robust than *lineola* Fabr., with the thorax broader, subquadrate and sides parallel, lateral margin of metathorax serrate, the first abdominal segment broader, and second segment differently ornamented. Compared with *phalerata* this species is broader and stouter, and the thorax shorter and more quadrate.

6. **M. phalerata** Klug (Nova Acta Cæs. Nat. Curios., x, 308, pl. xxii, fig. 3).—♀.—Length 8.5 mm.—Head and thorax deeply, closely and confluently punctured, the former subtransverse, slightly broader than thorax; eyes rather large, ovate, flattened and distinctly netted; thorax elongate, at least twice longer than broad, more or less narrowed towards the middle from both ends; metathorax obliquely truncate, the lateral margin with several small acute teeth; pleura impunctate and pale sericeous; abdomen ovate, as long as head and thorax combined; first segment broad, depressed, gradually dilated posteriorly and sessile with base of second segment; apical segment above finely longitudinally aciculate, or alutaceous.

Black; cheeks, occiput, face and scape of antennæ clothed with rather long griseous pubescence; vertex with a very short pale golden pile, more obvious in certain lights, otherwise the pubescence is fuscous; middle of mandibles, tubercles at base of antennæ and base of flagellum more or less, rufo-testaceous; thorax ferruginous, sparsely pubescent, sometimes an elongate black spot on each side of mesothorax posteriorly; legs black, rather thickly clothed with pale glittering pubescence, tarsi rufo-testaceous, calcaria pale; abdomen above with short appressed black pubescence, that on base and sides long, thin and pale; apical margin of first and second segments narrowly, and two narrow stripes extending from base of second segment to the apical segment, of silvery ochraceous pile, sometimes interrupted into spots on segments 3-5; venter piceous or rufo-piceous, the segments fringed at apex with griseous pubescence.

Chapada; Rio de Janeiro. This seems to accord tolerably well with Klug's description and figure.

7. **M. exclamationis** ♀.—Length 8.5 mm.—Form slender; head subtransverse, a little broader than thorax, deeply and confluently punctured; eyes

rather large, ovate, flatly convex, distinctly netted; thorax elongate, laterally compressed, slightly narrowed medially, coarsely confluently punctured above; metathorax obliquely truncate behind, the lateral apical margins serrate; flanks of thorax excavated and shining; abdomen ovate, first segment not very broad, but gradually widened behind and sessile with base of second segment; apical segment convex, smooth and shining.

Head black, occiput, cheeks and face beneath antennæ clothed with pale glittering pubescence; top of vertex generally with two pale golden spots; mandibles more or less, often the basal half of antennæ, including the two tubercles at base, and the thorax ferruginous; legs vary from black to ferruginous, clothed with pale pubescence, calcaria whitish; abdomen black, clothed above with short black pubescence, thinly interspersed with longer hairs, which are pale at base and sides of abdomen; first segment ferruginous, with a spot of ochraceous pubescence on lateral apical margin, remaining segments with two silvery-ochraceous stripes, narrowed and subinterrupted before reaching apex of second segment, where it forms a triangular spot, occasionally these stripes are interrupted into spots, except on base of second segment, where they are always entire, the stripes on this segment resembling exclamation points (!!); ventral segments fringed at apex with pale pubescence, the second segment always ferruginous, as is also occasionally the whole of venter and sides of dorsal segments.

Chapada. Closely allied to *lineola*, but the apical margin of second abdominal segment is not banded, the spots on each side showing no disposition to become confluent. Specimens will doubtless occur with the thorax, legs and abdomen ferruginous and only the head black.

This may be *bilineipunctata* Spin.

8. **M. dividua** ♀.—Length 8.5 mm.—Closely confluently punctured; head quadrate, slightly broader than thorax, not narrowed behind eyes, posterior angles rounded, posterior margin of cheeks carinate; eyes rounded, convex, smooth and polished; thorax short, broad, fiddle-shaped, anterior angles sharp, acutely toothed on each side before the middle; metathorax rounded above, abruptly declivous behind, lateral margins dentate, flanks deeply excavated, smooth and shining; abdomen ovate, first segment broad at apex, gradually widened posteriorly, sessile with and conforming in outline with base of second segment; venter shining, deeply and rather sparsely punctured.

Head velvety-black, mandibles, except tips, ferruginous; an oblique spot behind each eye and the cheeks silvery pubescent; thorax entirely ferruginous, the pubescence pale, except above, where it is mixed with black, a patch of silvery pile on lateral excavation; legs brown, with pale glittering hair; calcaria pale; abdomen velvety brown-black, the pubescence at base, sides and apex pale; a narrow median stripe extending from middle of first segment to apex of fifth, a triangular spot on sides of second segment and the lateral apical margin of segments 2–5, all silvery pubescent; venter ferruginous, with pale pubescence.

Chapada (May and November). Two specimens. Separated at once from all the other species by the narrow central silvery stripe on entire length of the abdomen to apical segment.

This may be *Gounellei* André, but no mention is made in the description of the rather large triangular silvery mark on sides of second abdominal segment, and the median stripe is not interrupted.

9. **M. credula** ♀.—Length 8 mm.—Densely confluently punctured; head transversely quadrate, broader than thorax, scarcely narrowed behind eyes, posterior angles rounded; eyes round, convex, smooth and polished; thorax short, broad, fiddle-shaped, lateral margins dentate; metathorax rounded above, abruptly declivous behind, flanks deeply excavated, smooth and polished; abdomen ovate, about as long as head and thorax together, first segment broad at apex, gradually widened posteriorly and conforming in outline with base of second segment; apical segment flattened at apex and minutely granulate; venter shining, closely punctured.

Head black, opaque; cheeks and an arcuate band on head above, silvery in certain lights; mandibles except tips, scape of antennæ and thorax entirely, ferruginous; legs brown, with pale pubescence; calcaria pale; abdomen black, opaque, apical margin of segments above and beneath fringed with silvery pubescence; a rather broad silvery pubescent band across middle of second segment above; first segment beneath ferruginous.

Santarem (November). One specimen.

10. **M. crepera** ♀.—Length 8 mm.—Densely confluently punctured; head not much extended behind eyes, rounded; eyes unusually large, round, convex, smooth and polished; thorax fiddle-shaped, with a sharp prominent erect tooth on each side at base of metathorax, which latter is rounded above, abruptly declivous behind, lateral margins denticulate, the flanks deeply excavated, smooth and shining; abdomen oblong-ovate, about as long as head and thorax together, first segment broad at apex, gradually widened behind and conforming in outline with base of second segment; apical segment flattened, margined laterally and very minutely roughened; venter shining, closely punctured.

Head black, opaque, with long sparse hair, pale on front, cheeks silvery sericeous, mandibles ferruginous, except tips; thorax entirely ferruginous, with black pubescence, longer and pale on metathorax; legs piceous, ferruginous at base, with pale pubescence, calcaria white; abdomen black, the pubescence above short and black, more or less pale at sides and beneath, basal segment above ferruginous at base, clothed with long rather dense pale pubescence; second segment with an obscure red band across the middle, slightly narrowed on disk and covered with short silvery pubescence; a broad silvery band on segments 3-5; beneath, the first and base of second segments ferruginous.

Benevides (July). One specimen. Compared with *credula*, this species is narrower in form, with much larger and more prominent eyes; thorax narrower, with a prominent erect tooth on each side behind the middle, and the abdomen is differently ornamented, having an obscure red band across the middle of second segment above.

11. **M. paulula** ♀.—Length 5 mm.—Very small, elongate, narrow; head slightly broader than thorax, transverse; eyes round, convex, polished; thorax

short, fiddle-shaped, densely punctured; anterior angles of mesothorax rounded, sides without teeth; metathorax obliquely declivous behind, flattened, with large, broad, reticulate punctures, the lateral margins minutely serrate; flanks of thorax smooth and polished; abdomen elongate, rather longer than head and thorax together, basal segment gradually widened to apex, which is as broad as base of second segment; apical segment convex, smooth and shining.

Head black, clothed with golden pubescence; face about base of antennæ, mandibles except tips, and antennæ, pale ferruginous; thorax ferruginous, a fuscous stain on each side of mesothorax anteriorly; legs rufo-testaceous, tibiæ varied with fuscous; calcaria white; abdomen black, first segment ferruginous, all clothed with silvery sericeous pubescence, especially at sides; second segment with two rounded, obscurely reddish spots above, covered with silvery pubescence; viewed from above the third to fifth segments have each a discal spot of silvery pubescence; beneath, the second and following segments have a transverse ferruginous line near apex.

Chapada (May). One specimen.

12. **M. parata** ♀.—Length 8 mm.—Small; head slightly broader than thorax, transversely subquadrate, scarcely narrowed behind eyes; cheeks longitudinally and acutely carinate beneath; eyes rounded, convex, smooth and polished; thorax short, broad anteriorly, fiddle-shaped; mesothorax densely punctured, anterior angles acute, three teeth on each side on posterior lateral margin; metathorax broad, depressed, with large, shallow, reticulate punctures, becoming smooth at apex, the lateral margin dentate; flanks of thorax smooth and shining; abdomen ovate, as long as head and thorax together, basal segment gradually widened to apex, which is as broad as base of second segment.

Head black, the front golden sericeous, the cheeks silvery sericeous, mandibles, except tips, ferruginous; antennæ fusco-ferruginous, paler at base; thorax ferruginous, mesothorax above with black pubescence, longer and pale on metathorax, anterior margin of mesothorax narrowly black; legs ferruginous, tibiæ and tarsi more or less tinged with fuscous, calcaria pale; abdomen black, with long scattered pale hair, and apical margin of the segments above and beneath fringed with silvery pubescence; an elongate, sublunate, testaceous mark on each side of disk of second segment above, slender toward base of the segment, the dilated portion toward tip and directed outwardly; third and following segments above densely clothed with silvery sericeous pubescence.

Rio de Janeiro (November). One specimen.

13. **M. bilunata** Burm. (Braz. Mutill., 1854, p. 10; *melanocephala* ‖ Perty, Del. An. Art., p. 137, pl. 27, fig. 6).—♀.—Length 12 mm.—Robust; head large, transversely quadrate, broader than thorax, broad between eyes, rounded posteriorly, cheeks closely punctured, carinate beneath, unarmed; eyes rounded, convex, polished; thorax fiddle-shaped, broad and square in front, anterior angles acute, on each side a large, flattened, subacute tooth, curved posteriorly, and behind it a small tooth; metathorax depressed, rounded at sides and serrate; flanks smooth, polished; legs slender; abdomen short, ovate, convex; first segment broad at apex, sessile with base of second segment and conforming in outline therewith; second ventral segment finely, not closely punctured.

Head velvety black, with black pubescence, clypeus with some yellowish hair; scape fuscous; thorax honey-yellow, with golden pubescence, intermixed with black; collar and narrow anterior middle of prothorax black, with black pubescence; legs entirely honey-yellow; calcaria whitish; abdomen black, with black pubescence, except on pale portions; first segment dull honey-yellow on basal half, with long pale hair; second segment with a large lunate golden-testaceous mark on each side of the middle, almost meeting on the disk, the inner lobe narrow and reaching base of the segment; segments 3–6 with dense pale golden pubescence; venter with pale pubescence, the first and basal middle of second segment honey-yellow.

Rio de Janeiro (November). One specimen. Easily known by the large black head, honey yellow thorax and legs, and the two large pale yellow lunate marks on second abdominal segment.

14. **M. pergrata** ♀.—Length 8 mm.—Small; head slightly broader than thorax; transversely subquadrate, scarcely narrowed behind eyes; cheeks longitudinally and acutely carinate beneath; eyes rounded, convex, smooth and polished; thorax short, broad anteriorly, fiddle-shaped, above densely punctured, longitudinally strigose on disk of metathorax; anterior angles of mesothorax acute, the posterior lateral margin with two short, blunt teeth; lateral margin of metathorax acutely dentate; flanks of thorax smooth and shining; abdomen ovate, about as long as head and thorax together, basal segment gradually widened at apex, which is as broad as base of second segment; apical segment depressed, smooth.

Head black, with black pubescence, cheeks and face silvery sericeous; mandibles and basal half of antennæ ferruginous, apical half fuscous; thorax entirely ferruginous, except a fuscous stain on disk of metathorax; pubescence of thorax above rather long, erect and blackish; legs entirely pale ferrugineous; calcaria pale; abdomen black, the erect pubescence on second segment above long and blackish, that on the sides silvery; third and following segments densely clothed with silvery pubescence; on each side of second segment above a transversely quadrate testaceous spot, deeply indented anteriorly, giving the spot a sublunate appearance; venter blackish, with pale pubescence, the second segment testaceous, except apical margin.

Rio de Janeiro (July). Size and form of *parata*, but differs in the ornamentation of the second segment of abdomen, and in the sculpture of the metathorax; resembles *bilunata* in markings, but otherwise very different.

15. **M. pacata** ♀.—Length 4.5 7 mm.—Small; head transverse, slightly broader than thorax, narrowed behind eyes; cheeks longitudinally and acutely carinate beneath; eyes large, convex, smooth and polished; thorax short, broad, fiddle-shaped, densely confluently punctured above, anterior angles acute; lateral margin of mesothorax with two acute approximate teeth; metathorax abruptly declivous behind, the lateral margins acutely dentate; sides of thorax deeply excavated medially, smooth and shining; abdomen ovate, shorter than head and

thorax together, basal segment gradually widened at apex, which is as broad as base of second segment and slightly constricted; apical segment flattened at tip, smooth and shining.

Head testaceous, paler on each side of vertex, golden sericeous; cheeks and narrow posterior margin of head black; flagellum blackish above; thorax rufo-testaceous above, anterior margin narrowly, a large spot on middle of meso-thorax, and a narrow stripe on disk of metathorax, black; thorax laterally and beneath, and the legs testaceous or honey-yellow; calcaria whitish; abdomen above honey-yellow, second segment black except narrow basal margin, a large, broad, lunate, ochraceous spot on each side; segments 3–5 clothed with ochraceous pubescence; venter dull testaceous, varied with fuscous.

Santarem. Two specimens.

16. **M. tantula** ♀.—Length 4.5 mm.—Very small; head rather broader than thorax, transversely subquadrate; eyes round, convex, smooth and polished; thorax short, broad, fiddle-shaped, anterior angles acute, lateral margin of meta-thorax serrate; abdomen about as long as head and thorax together, basal segment gradually dilated to apex, which is as broad as base of second segment.

Ferruginous; head golden sericeous; apex of antennæ fuscous; thorax more or less varied with dusky above, somewhat golden sericeous, the erect hair blackish; the pubescence at apex of metathorax, on sides of thorax and legs pale; calcaria whitish; second segment of abdomen above blackish, with two oblong, subovate, dull ferruginous spots, clothed with pale golden pubescence, as are also the following segments.

Corumba (April). One specimen.

17. **M. Jannarii** Dalla Torra (Catal. Hym., viii, p. 48; *pectoralis* || Smith, (Descr. New Species Hym. Brit. Mus., 1879, p. 211).— ♀.—Length 7.5 mm.—Small, slender, densely confluently punctured; head wider than thorax, transversely subquadrate when viewed from above; eyes large, ovate, netted; thorax without spines or tubercles, rounded above, slightly subcompressed; abdomen oblong-ovate, basal segment quadrate, depressed, slightly dilated posteriorly.

Head black; scape, two basal joints of flagellum, thorax, legs entirely, and most of abdomen, honey-yellow; second segment of abdomen above, except sides and apical margin, black; an indistinctly defined ovate spot of ochraceous pubescence on each side of second segment above near base; sides and apex of same segment and the remaining segments clothed with silvery ochraceous pubescence; calcaria pale.

Rio de Janeiro (November). One specimen.

18. **M. invitata** ♀.—Length 6 mm.—Small, form slender; head subtriangular, transverse, much broader than thorax; eyes large, ovate, distinctly netted; thorax closely and finely punctured, rather long, subcompressed, rounded above, slightly narrowed anteriorly and gradually narrowed and sloping behind, sides not constricted or toothed; abdomen ovate, densely, finely punctured, first segment narrow, quadrate, depressed, apical segment rounded above, smooth, shining; venter smooth, shining, except second segment, which is deeply punctured; apical segment convex.

Head black, with dense golden pile above and on face; thorax dark ferruginous, the spiracles yellow; legs fuscous, with pale hair; calcaria pale; abdomen velvety black above, first segment fuscous; two narrow silvery ochraceous pubescent stripes extending from base of second segment to apex of fifth, slightly broadened posteriorly; venter with pale pubescence.

Chapada (April). One specimen. Recognized by the red thorax, and the black abdomen with two long pale stripes, much as in *bitæniata* Spin.

19. **M. benevola** ♀.—Length 6.5–7 mm.—Form of *invitata;* head fuscous or black, more or less covered with pale golden or silvery pile; thorax dull ferruginous, with a broad black stripe on each side, interrupted at base of metathorax and forming a broad V-shaped mark thereon; legs entirely honey-yellow; calcaria pale; abdomen black, sides more or less ferruginous; a large mark on each side of second segment above rounded within and enclosing a black spot, a broad apical band indented medially and confluent at sides with anterior mark, and a broad transverse spot on disk of remaining segments, of dense golden pile

Var.?—The black V-shaped mark on metathorax less distinct, and the golden spots at base of second abdominal segment smaller and not enclosing a black dot.

Santarem. Three specimens. The abdomen is ornamented much as in *pachycnemis* Burm., which it resembles in form, but in that species the head is entirely black.

20. **M. beatula** ♀.—Length 4–6 mm.—Form of *invitata*, but much smaller and the head not so broad; thorax marked much as in *benevola;* sides of second segment of abdomen, a broad apical band with undulate anterior margin, two short oblique stripes at base widely divergent posteriorly, and the remaining segments entirely, except central brownish spot, of dense golden pile; first segment ferruginous, silvery at base; venter ferruginous.

Santarem.

21. **M. integella** ♀.—Length 9 mm.—Head transverse, the eyes round, very convex, polished, separated from posterior margin of head by a narrow space; thorax rugose, slightly narrowed anteriorly and gradually so posteriorly, the lateral margin not constricted, unarmed, anterior angles of prothorax acute, metathorax abruptly declivous, the flanks excavated; abdomen with first segment nodose, the second densely punctured and opaque; apical segment flattened, longitudinally striated.

Black; with scattered, erect black pubescence; head with appressed golden pile; thorax ferruginous, the prothorax and spot on upper part of flanks black; lower portion of flanks with a patch of silvery pubescence; legs fuscous, paler at base, calcaria pale testaceous; abdomen fuscous, darker on the second segment above; apex of first segment silvery, the second with two oblong, opaque, yellowish spots; extreme sides of second segment silvery pubescent; apical segment with golden pubescence.

Chapada (April).

22. **M. verecunda** ♀.—Length 7.5 mm.—Same form as *integella*. Head with silvery pubescence; thorax ferruginous, the prothorax and a large irregular stain on mesothorax black; legs fuscous, calcaria pale; abdomen fuscous, the first segment with a patch of whitish pubescence at apex; second segment blackish above, with a large, broad, elongate, ferruginous spot on each side, narrowed anteriorly and reaching the basal margin of the segment; extreme sides of second segment and a dot on apical middle silvery pubescent; the apical segment more or less silvery on middle above.

Chapada. One specimen. Very much like *integella*, but the two spots on second abdominal segment are much larger, longer and ferruginous.

23. **M. harpyia** Gerst. (Archiv. f. Naturg. xl, p. 65).—♀.—Length 12–14 mm.—Closely but not coarsely punctured; head very broad, transversely subquadrate, occiput very deeply triangularly emarginate, posterior angles sharply carinate; cheeks finely punctured, closely so near the eyes; face beneath antennæ deeply transversely excavated, the antennæ inserted in the excavation, the front with two prominent, porrect, well separated, slightly divergent tubercles overhanging insertion of antennæ; eyes small, subovate, subconvex, smooth and polished, unusually distant from each other; mandibles long, sharp, with a large stout tooth on upper edge before apex, and a curved groove on middle of upper surface; thorax short, subquadrate, about one and a half times longer than broad, constricted laterally about the middle, where the margin is subtuberculate; metathorax abruptly truncate behind, the lateral margin carinate, but not serrate; flanks of thorax impunctate; abdomen short, broad, ovate; first segment very broad at apex and sessile with base of second; pygidium broad, finely alutaceous, smooth at tip, with the edges reflexed.

Black; the pubescence above short, appressed and black; cheeks sparsely clothed with pale pubescence, the face beneath antennæ fringed with long, pale, glittering hair; mandibles red medially; antennæ sericeous, scape piceous, with pale pubescence; a suboblique, silvery pubescent stripe on each side of head behind eyes, slightly widened posteriorly, and on each side of thorax above a silvery-ochraceous stripe, slightly broader on metathorax, and not extending beyond the verge of the truncation; legs piceous, with pale hair, those on four posterior tibiæ above more or less black; calcaria white; abdomen at base, sides and apex above with pale hair; a pale golden pubescent stripe begins on middle of first segment and extends to apical fourth of second segment, and on each side of the apex of this stripe there is a rather small subtransverse spot of same color; apical middle of segments 4 and 5 above more or less silvery ochraceous; venter shining black, with pale pubescence, especially on apical margin of the segments.

Chapada. Compared with *bucephala* Perty, this species differs chiefly in the posterior margin of the head being very much more deeply emarginate, the lateral angles acute, the cheeks not armed beneath base of mandibles, the thorax quite as broad in front as behind, and with a silvery pubescent stripe on each side above, and the abdomen above is differently ornamented, having a central pale

ochraceous pubescent stripe on the two basal segments and a spot on each side near apex of second segment.

24. **M. vera** ♀.—Length 8 mm.—Head transversely subquadrate, broader than thorax, posterior angles rounded, carinate, the carina extending beneath on cheeks nearly to base of mandibles; the eyes round, very convex, polished; thorax rugosely punctured above, short, fiddle-shaped, slightly broader in front, anterior angles acute, lateral middle rather deeply constricted, the lateral margin with two teeth or tubercles in front of the constriction; metathorax obliquely declivous behind, the lateral margins acutely dentate; flanks of thorax broadly excavated about the middle, smooth and polished; abdomen ovate, first segment broad at apex, sessile with base of second and conforming in outline therewith; the pygidium smooth and shining; first segment beneath unarmed, the second sparsely punctured.

Velvety black above; antennæ, mandibles, collar and metathorax above, the thorax at sides and beneath, legs and first segment of abdomen, ferruginous; head above and between eyes with dense pale golden pubescence; a silvery stripe on each side of thorax, extending from middle of mesothorax to middle of metathorax; thorax beneath and legs with sparse pale pubescence; calcaria white; the three basal segments of abdomen at apex above, triangularly dilated on apical middle of second, and the terminal segment above, clothed with pale golden pubescence; ventral segments fringed with pale pubescence.

Chapada. (April). One specimen. A very pretty little species, with its large bright golden head, silvery stripe on each side of thorax, pale golden band on apices of first and second abdominal segments, and the ferruginous antennæ and legs.

25. **M. cephalotes** Swed. (Klug, Nova Acta Ges. Nat. Cur. x, p. 322, pl. xxiii, fig. 11).—♀.—Length 17 mm.—Head very large, depressed, quadrate, prolonged behind the eyes; cheeks with a large acute tooth beneath; thorax somewhat fiddle-shaped, being broadest at anterior tubercles which are prominent, slightly narrowed anteriorly and rapidly so posteriorly to the metathoracic spiracles; legs robust, spines on tibiæ stout; abdomen ovate, first segment depressed, conforming in outline with base of the second segment, being only slightly constricted at apex.

Head black, cheeks more or less, and scape with pale pubescence; thorax black with two broad, pale golden pubescent stripes extending anteriorly from apex of metathorax almost to posterior margin of prothorax; flanks densely pale golden pubescent; legs black with pale hair, calcaria black or fuscous; abdomen black, the first segment, sides of and narrow apical margin of second and remaining segments, except black central stripe, pale golden pubescent; on middle of second segment above a large, rounded, bright orange-golden or cupreous pubescent spot.

Brazil (no definite locality). Two specimens.

26. **M. specularis** Gerst. (Archiv. f. Naturg. xl, p. 47).—♀.—Length 12 mm.—Densely punctured; head large, quadrate when viewed in front, much broader than thorax, slightly narrowed posteriorly, very broad between the

small, ovate, depressed eyes, the distance from the eyes to posterior margin of head more than half that between the eyes themselves; posterior margin broadly not deeply concave, and that of cheeks acutely carinate and ending beneath in a prominent acute tooth; antennæ long, slender; thorax rather small, fiddle-shaped, the sides anteriorly—when viewed from above—acutely angular; metathorax short, rounded above, truncate behind, the lateral margin subcrenulate, flanks depressed, finely, transversely wrinkled; tibiæ strongly spined, tarsi long, slender; abdomen with first segment transversely rounded when viewed from above, depressed, subsessile with base of second segment; second ventral segment subconvex, sparsely punctured.

Black, the pubescence black, with short and long scattered erect hair; an ill-defined oblique spot behind each eye, more distinct when viewed in front, the cheeks in certain lights, two spots on mesothorax and also on metathorax, both subconfluent, and lower margin of flanks, all golden pubescent; tubercles at insertion of antennæ, and mandibles except tips, ferruginous; scape and base of flagellum fuscous, sericeous with golden pubescence; sides of thorax and legs brown, the latter with long, pale pubescence; calcaria pale fuscous; first abdominal segment, and venter brown, with pale pubescence; second segment with a large rounded central spot of dense appressed orange-golden pubescence; apical margin of segments 2 and 3 and sides of 6 fringed with pale golden pubescence.

St. Catherina. The ornamentation of second abdominal segment above is much like that of *cephalotes*, which it closely resembles (although only half the size), but without the lateral silvery stripes.

27. **M. spiniceps** ♀.—Length 15 mm.—Coarsely, confluently punctured; head large, quadrate, broader than thorax, deeply emarginate posteriorly, the sides behind eyes rounded and narrowed to the acute posterior angles; two short tubercles between insertion of antennæ; posterior angles of occiput with a strong sharp carina, forming an acute tooth when viewed from above; head beneath with two long, subacute, slightly divergent, distant teeth, behind each of which is a somewhat hooked tooth on lower posterior angles of the head; eyes ovate, distinctly netted; thorax short, fiddle-shaped, a short stout tubercle on each side just behind the prothorax; metathorax short, rounded above, abruptly declivous behind, posterior disk flattened; flanks of thorax excavated, smooth and polished; abdomen ovate, about as long as head and thorax together; first segment subnodose, dilated posteriorly, subconstricted and depressed at apex, the anterior face of the segment being broadly flattened, and almost smooth; pygidium ovate, feebly punctured, sides acutely margined; venter shining, deeply and sparsely punctured.

Head and thorax entirely deep black; clypeus with long white hair; flanks of thorax with silvery sericeous pile; legs piceous, with long, rather sparse whitish hair, coxæ silvery sericeous, calcaria honey-yellow; abdomen black, narrow apical margin of the segments and also the pygidium, dark ferruginous, second segment above with an elongate ovate discal spot of golden pubescence, and the third segment with a transverse golden spot on each side of the middle; apical margin of the segments beneath fringed with long pale pubescence.

Santarem. One specimen.

28. **M. centromaculata** ♀.—Length 15 mm.—Form same as in *spiniceps*, except that the head laterally behind eyes is more straight and not narrowed to the tooth at posterior angles; when viewed from above, this tooth is slightly divergent and not bent inward as in *spiniceps;* the two teeth beneath on the throat are close together, straight and distant from the tooth on under side of cheeks; clypeus with a long, narrow, flattened process on apical middle, somewhat as in *armata*, but less porrect, and deeply emarginate at apex.

Color much as in *spiniceps;* the cheeks, a large rounded spot on each side of head behind eyes and the sides of mesothorax above, clothed with silvery pubescence; the silvery pile on flanks of thorax is more dense and brilliant; calcaria honey-yellow; sides of first segment above, basal sides and lateral apical margin of second and an interrupted band on apex of third segment, clothed with dense silvery pubescence; middle of second segment above with a rather large ovate spot of cupreous pubescence; apical margin of the segments above and beneath fringed with long pale hair, the depressed apical margin of the segments ferruginous.

Paracary (January). One specimen. Closely allied to *spiniceps*, but amply distinct by the different armature of the head. It also resembles *cephalotes* in color, but differs in the form of the head and of first segment of abdomen, while the cupreous spot on second segment is much smaller.

Also closely resembles *moneta* Gerst., which, however, has no such projection on the clypeus; the tooth on cheeks beneath longer, and those on the throat shorter and more widely separated; the posterior angles of the head are acutely produced when viewed from the side; and the first segment of the abdomen is narrow at apex. In ornamentation *moneta* has the pale pubescent markings on the abdomen above almost exactly like those in *centromaculata*, but uniformly golden, while in the latter species they are silvery, except the central spot on second segment which only is golden.

29. **M. Smithii** ♀.—Length 15–17 mm.—Head and thorax coarsely, rugosely punctured; head very large, quadrate, truncate behind, posterior angles above rounded, beneath armed with a rather short acute tooth directed forwards; two small obtuse tubercles between insertion of antennæ; eyes small, short ovate, flattened and distinctly netted, placed on the vertex, and leaving nearly as much space between them and the occiput as that between the eyes themselves, which are unusually wide apart; thorax fiddle-shaped, but broader in front than behind, and strangulated at the middle laterally, the lateral margin in front of the constriction obtusely angular, not dentate; disk of metathorax rounded above, the posterior face slightly concave and smooth, upper margin of flanks coarsely, subobliquely striated, as are also the sides of the thorax anteriorly; metathoracic spiracles prominent, polished; middle flanks of thorax deeply excavated, smooth and polished; abdomen short, ovate, the first segment

broad behind and sessile with base of second segment; pygidium alutaceous at base, smooth at tip.

Black; cheeks, space on front between eyes and scape of antennæ thinly clothed with pale glittering pubescence; an oblique silvery pubescent stripe behind eyes; on each side of metathorax above a silvery pubescent stripe extending forward nearly or quite to middle of mesothorax; lower margin of flanks of thorax with patches of dense silvery pubescence; legs black, clothed with pale pubescence, long and thin on femora; on outer sides of four posterior tibiæ the pubescence is more or less black, the calcaria black or fuscous; abdomen clothed above with appressed black pubescence; first segment with a silvery patch on each side of disk above; on each side of second segment at base a short, suboblique silvery stripe, between which and the lateral margin the surface is smooth and polished; on basal middle of this segment a pyriform or subtriangular spot of pale golden or orange-golden pubescence, the narrower part reaching the base of the segment; two rather broad silvery stripes on apical half of the abdomen above, beginning at apex of second segment; venter with sparse, pale hairs, the apical margin of the segments fringed with pale pubescence.

Chapada. Common. Allied to the three preceding species, and also to *armata* Klug, but very different in many ways.

It gives me much pleasure to dedicate this handsome species to my friend Herbert H. Smith, the indefatigable collector in Natural History, and by whose discoveries so many new and beautiful species have been added to our knowledge of the South American fauna.

30. **M. armata** Klug (Nova Acta Cæs. Cur., x, p. 323, pl. xxiii, fig. 12).— ♀ — Length 18 mm.—Head very large, transversely subquadrate, twice broader than thorax, prolonged behind eyes, lateral posterior margin acutely carinate, and when viewed from above the lateral angles appear acutely spinose; beneath, the cheeks have on each side a long, divergent, acute tooth, behind which is a small acute tooth; clypeus with a long, median, obtuse, porrect, slightly recurved tooth, above which are two short obtuse tubercles; eyes small, ovate, depressed, very wide part, the front being unusually broad; mandibles long, acute at tip; thorax narrow, subcompressed, the lateral tubercles at posterior margin of prothorax prominent; metathorax abruptly declivous behind, the lateral margin not serrate, flanks smooth, impunctate; legs slender, tibiæ and tarsi strongly spinose; abdomen ovate, basal segment subpetiolate gradually dilated posteriorly, the anterior face flat and obliquely declivous, the apex transversely narrowed, band-like, with a row of short suberect teeth on anterior margin; pygidium finely alutaceous; ventral segments strongly not densely punctured.

Velvety black, with long, scattered, black hair; a subtriangular spot behind each eye, a long U-shaped mark on thorax above, lower portion of pleura, a band on apex of first segment of abdomen, a narrow, elongate mark on middle of second segment and a spot on each extreme side near base, also narrow apical margin of this segment, broadly interrupted on disk, and a wedge-shaped mark on each side of third segment, pointed to disk, all of pale golden or silvery pubescence; base of antennæ, legs, apex of abdomen and venter more or less clothed

with pale pubescence; calcaria black; base of second ventral segment ferruginous or dark red.

Chapada. Resembles *Smithii* in form, but the armature of the head is different, as is also the ornamentation.

31. **M. bucephala** Perty (Del. An. Art. Braz., p. 137, pl. 27, fig. 8).— ♀.— Length 13 mm.—Head very large, transversely subquadrate, occiput slightly emarginate, almost truncate, lateral angles rounded, sharply carinate, the carina continued forwards on the cheek beneath, and ending in an acute or subacute, oblique tooth directed forwards beneath base of mandibles; cheeks deeply punctured; two longitudinal, subtuberculate carinæ between insertion of antennæ, immediately beneath which is a tuft of long pale pubescence; mandibles deeply grooved along upper surface; eyes small, ovate, depressed, finely netted, not polished; thorax very short, broadest in front, then narrowed to base of metathorax, where it is somewhat constricted, the lateral margin not dentate; metathorax abruptly declivous and truncate behind, the posterior face flat, smooth and shining; abdomen short, broad ovate, first segment broad, sessile with base of second segment; pygidium opaque, densely and finely punctured.

Velvety black above; cheeks almost nude, having a scattered pale pubescence; sides of clypeus clothed and fringed with white pubescence; a broad oblique pale ochraceous stripe behind each eye; scape of antennæ with pale pubescence; posterior face of metathorax with sparse erect black hair, a pale ochraceous pubescent stripe on each side from spiracles to apex; mesothorax with a narrow central ochraceous-yellow stripe on its entire length, sometimes interrupted medially; flanks of thorax with pale ochraceous pubescence on lower margin, above which midway is a broad, shallow, smooth, polished excavation; legs black, with sparse black pubescence; calcaria black; abdomen above velvety black, a spot on apical middle of first segment, sometimes continued on base of second, a stripe on lateral margin of first segment and basal half of second (beneath which the surface is smooth and shining), a triangular spot on apical middle of second segment, continued in a narrow stripe to apical segment, and lateral margin of all the segments more or less, all of pale ochraceous pubescence, the central spot on segments 1 and 2 generally ochreous-yellow; venter shining, thinly clothed with pale pubescence, the segments fringed at apex with pale hair.

Corumbá, Chapada.

32. **M. victura** ♀.—Length 8-10 mm.—Head large, quadrate, broader than thorax; occiput emarginate, lateral posterior angles rounded, carinate, the carina extending on cheek beneath and ending in an obtuse compressed tooth below base of mandibles; cheeks densely punctured; above insertion of each antenna a prominent obtuse tooth or tubercle; on middle of clypeus two divergent carinæ joined at base and extending to anterior margin; mandibles with a longitudinal groove on upper margin, which is not toothed; eyes small, rounded, very convex, smooth, polished; thorax short, fiddle-shaped, broader anteriorly, strongly constricted at lateral middle, before the constriction are two prominent tubercles, the posterior one smaller and acute; metathorax obliquely declivous, the lateral margin coarsely serrate; flanks of thorax smooth, impunctate, broadly and shallowly excavated about the middle; abdomen ovate, first segment broad, not constricted

at tip, which is sessile with base of second segment and conforming in outline therewith; pygidium sparsely punctured, shining; beneath, the first segment has a large prominent compressed tooth, second segment shining, sparsely punctured.

Velvety black above; cheeks, face and scape of antennæ clothed with silvery pubescence; two broad, oblique, golden stripes on vertex; mandibles generally, and occasionally the frontal tubercles, rufo-ferruginous; lateral margin of thorax above, broader on metathorax, silvery or pale golden; flanks of thorax with short pale sericeous pubescence; legs black, with pale glittering pubescence; calcaria white; a spot on apical middle of first abdominal segment, often extending a short distance on the second, a stripe on middle of apical half of second segment, extending to apical segment, and an oblique spot on each side of second segment posteriorly, all of silvery or pale golden pubescence, those on disk of first and apex of second segments generally darker in color than the rest; lateral margin of all the segments, and the apical segment, with longer silvery-white pubescence; venter sometimes pale piceous, thinly clothed with pale pubescence, more dense on apical margin of the segments.

Var. *a*.—Head and thorax above entirely black, except lateral margin of metathorax above, which is sometimes silvery.

Var. *b*.—Head above entirely golden.

Chapada. Common.

33. **M. gigantea** Perty (Del. An. Art., p. 138, pl. 27, fig. 9).—♀.—Length 18–20 mm.—Large, black; head quadrate, not broader than thorax, rounded posteriorly, prolonged behind eyes, which are small, convex, polished; vertex with two broad silvery-white pubescent stripes over the eyes; thorax narrowed anteriorly, sides tuberculate or spinose, those at base of mesothorax prominent, obtuse, smooth and polished; spiracles at base of metathorax prominent, two silvery-white pubescent stripes on metathorax, ending anteriorly in a spot on each side of mesothorax at base; lower portion of flanks densely silvery pubescent; abdomen oblong-ovate, first segment broad at apex, anterior face flat, apex depressed band-like, with a subapical row of short teeth; sides of first segment, a double line on each extreme side of second, two short, slightly oblique, longitudinal lines on middle above, and sides of remaining segments, silvery white or pale ochraceous pubescent; legs more or less clothed with pale glittering pubescence, the apical porrect spine of posterior tibiæ thickened at base and suddenly narrowed toward apex into a slender acute spine; calcaria pale.

Chapada; Corumbá. Rather common. A large conspicuous species.

34. **M. cerbera** Klug (Nova Acta Ces. Nat. Cur., x, p. 312, pl. xxii, fig. 9).—♀.—Length 15–18 mm.—Rather slender, black; head small, transverse, not prolonged behind eyes, front long; eyes round, convex, polished; thorax slightly narrowed anteriorly, sides tuberculate, those at sides of mesothorax at base large, prominent, obtuse, those at anterior angles small, polished; metathorax rounded above and abruptly declivous posteriorly; legs slender, more or less clothed with white pubescence, the apical spine of posterior tibiæ slender throughout, calcaria black; head almost entirely, a small spot on disk of prothorax, a stripe on sides of metathorax, ending at base in a spot at spiracles, between which is a small cru-

ciform mark, lower portion of flanks, three stripes on first abdominal segment, continued on base of second, the central stripe shorter, forked at base and triangular at apex, a biarcuate band on apex of second segment, produced anteriorly on disk, sides of segments 2 and 3, two dots on apical middle of second, small spot on apical middle of segments 3 and 4, large spot on 5, and two bands on venter, all of appressed white pubescence; abdomen elongate oval, first segment narrow, gradually dilated posteriorly, and conforming in outline with base of second segment, which is narrow.

Chapada. Common.

35. **M. centrovittata.**—♀.—Length 8–13 mm.—Head transverse, not broader than thorax; eyes very convex, smooth, polished; thorax rather short, laterally subcompressed, not constricted when viewed from above, gradually narrowed posteriorly; metathorax rounded above; abdomen broad ovate, convex, gibbous at base of second segment; first segment small, narrow, flattened above; pygidium finely longitudinally aciculate; second ventral segment finely punctured.

Black, velvety, with scattered long black hair, erect on head and thorax and more or less decumbent on abdomen; head above and face densely ochraceous pubescent, with longer pale hair, paler on the cheeks; a stripe of ochraceous pubescence on disk of thorax its entire length, broad anteriorly, and gradually narrowed to apex of metathorax; flanks of thorax with dense pale ochraceous pubescence; legs with pale pubescence, the coxæ and femora with long pale hair, calcaria black; abdomen velvety black, first segment above, a large broad transverse, slightly oblique spot on each side of apical third of second segment, and a spot on disk of segments 4 and 5 above, of dense pale ochraceous pubescence; apical segment above, and the venter especially at base, more or less ferruginous; apical margin of ventral segments 2 and 3 fringed with pale pubescence.

Chapada. Common.

36. **M. Gazagnairei** André (Bull. Soc. Ent. France, 1895, p. cccxxii).—♀. —Length 8–12 mm. Closely allied to *centrovittata* both in form and color, but differs as follows: The head is clothed entirely with pale ochraceous pubescence, except a small black spot on disk of vertex; the thorax has *two* rather broad, entire pale ochraceous stripes above; the ochraceous spots on second abdominal segment are more widely separated on disk, and rather more oblique; the apical segments are broadly pale ochraceous at sides and with long pale hair, while the venter is fuscous, with long pale hair, and the apical margin of the segments fringed with pale pubescence; the apical segments above have no pale spots on disk; legs fuscous, with long pale hair.

Chapada. Common. Much like *centrovittata*, but easily separated by the thorax having two pale pubescent stripes, and by the apical segments of abdomen above having no discal spots.

37. **M. bifurca** Klug (Nova Acta Cæs. Nat. Cur., x, 313, pl. xxii, fig. 10).—♀. —Length 8–12 mm.—Head short, transverse, narrower than thorax; eyes round, smooth, convex; thorax oblong, rounded laterally and above, narrowed behind

mesothorax, very slightly constricted, unarmed; metathorax rounded above, posterior face declivous; abdomen elongate-ovate, longer than head and thorax; first segment small, depressed, gradually widened posteriorly and sessile with base of second segment; apical segment flat, longitudinally striated; beneath, the second segment is shining, strongly punctured.

Velvety-black, the pubescence black and appressed, a few erect hairs on head and prothorax anteriorly; head except occiput, a broad stripe on each side of metathorax, pleura, an oblique stripe when viewed from above—lunate when viewed from the side—on each side of second segment posteriorly, a line or spot on each side of segments 3-5, and a spot on middle of segments 4 and 5, all of dense, appressed silvery-white pubescence; calcaria pale; legs and apical margin of ventral segments 2-5, clothed with silvery pubescence.

Chapada. Common. A beautiful species, closely allied to the two preceding, but the pro- and mesothorax are entirely black above.

38. **M. auroplaga** ♀.—Length 4-6 mm.—Head transverse, scarcely broader than thorax; eyes subovate, flatly convex, distinctly netted; thorax almost square, a little longer than broad, slightly narrowed at lateral middle; metathorax abruptly truncate behind; abdomen oblong-ovate, first segment very broad, not at all constricted at tip, sessile with base of second segment and conforming in outline therewith, apical segment finely longitudinally acienlate.

Black, opaque; head uniformly clothed with silvery pubescence, as is also scape of antennæ; middle of mandibles more or less, and antennæ except base and apex, fusco-ferruginous; thorax above clothed with short black or fuscous pubescence, that on metathorax pale; a stripe on lateral margin of thorax above, connected posteriorly with a band on base of metathorax, of silvery pubescence; legs piceous, clothed with griseous pubescence, trochanters and tarsi more or less fusco-ferruginous; calcaria white; first segment of abdomen and basal sides of second clothed with long silvery-white hair; a spot of appressed silvery pubescence on sides of third segment, covering also the lateral apical margin of second; a broad stripe of bright golden or coppery-golden pubescence, commencing on apical middle of first segment, slightly dilated posteriorly and ending on apical middle of third segment; apical segment testaceous or rufo-testaceous, with a golden or coppery reflection, and fringed with long silvery-white pubescence; venter piceous, pale at apex and on apical margin of the segments, clothed rather sparsely with pale pubescence.

Chapada. A beautiful little species, with a broad, central, bright golden cupreous, pubescent stripe on abdomen above, extending from first to apex of third segments. Closely related to both *empyrea* Gerst. and *picta* André.

39. **M. calvaria** ♀.—Length 12-13 mm.—Form slender, densely confluently punctured, coarsely so on cheeks, and on sides of thorax and of abdomen; head broader than thorax, quadrate when viewed in front, transversely so from above; eyes ovate, finely netted; sides of cheeks longitudinally carinate beneath; thorax long, slender, subcompressed, gradually narrowed behind; abdomen ovate, strongly gibbous at base of second segment, basal segment depressed, quadrate, slightly dilated posteriorly.

Black, sparsely hairy; a transverse or triangular spot on head above, a slender longitudinal stripe on disk of metathorax, lower margins of prothorax, pleura and metathorax, basal segment of abdomen at sides and apex above, two small round or ovate spots on second segment above near base, also a band at apex interrupted on disk, its narrow lateral margin, and a narrow band near apex of second segment beneath, all silvery-white pubescent; apex of third and apical segments above and beneath more or less silvery in certain lights; calcaria white; in one specimen the transversely triangular spot on head above is ochraceous.

Chapada (January to April). Two specimens.

40. **M. felix** ♀.—Length 8 mm.—Much like *calraria*, but smaller and more pilose; face and most of head above densely pale ochraceous; a stripe on each side of metathorax (no central stripe), sides of prothorax, most of first segment of abdomen, broad band, interrupted medially, at apex of second segment, lateral margin of same, a small longitudinally quadrate spot on each side of disk of segments 3–5, sides of same, and bands on venter, all silvery white; no spots on base of segment 2; apical segment and legs with silvery hair.

Chapada (December). One specimen.

41. **M. erusa** ♀.—Length 11 mm.—Form slender; head coarsely, confluently punctured, viewed from above transversely subquadrate, broader than thorax; eyes rather large, ovate, finely netted; cheeks not carinate beneath, but toothed at the anterior extremity; thorax narrow, subcompressed, without spines or teeth; metathorax gradually narrowed posteriorly; abdomen ovate, gibbous, basal segment small, quadrate, depressed, very slightly widened posteriorly.

Head, pro- and mesothorax velvety black, with black hair; pleura, metathorax (except narrow longitudinal blackish stripe on disk) and basal segment of abdomen, pale golden or ochraceous pubescent; legs brown, with pale golden or ochraceous pubescence; calcaria whitish; abdomen black, two rather large rounded spots of dark golden or cupreous pubescence at base of second segment, and two quadrate spots of same color at apex of segments 2–5, large on 2 and diminishing in size on 3–5; ventral segments and lateral margin of dorsal segments with silvery-ochraceous pubescence.

Rio de Janeiro (October). One specimen.

42. **M. projectifrons** ♀.—Length 8–12 mm.—Very closely punctured, more coarsely so on the head and thorax above; head transverse, subquadrate, broader than thorax, occiput rather deeply emarginate, lateral angles obtusely rounded, sharply carinate, the carina on each side extending to middle of cheeks beneath and ending in a small acute tooth; face transversely excavated, the front overhanging or projecting like an overshoot, and armed on each side with a transversely compressed divergent tubercle, the tip of which is subacute and somewhat incurved; mandibles long, acute at tip, the upper edge armed with a large acute tooth about the middle; eyes small, rounded, very convex, smooth and polished; thorax a little longer than broad, short, fiddle-shaped, broader in front, deeply constricted at lateral middle, anterior angles acute, two acute tubercles on lateral margin in front of constriction, the anterior one much the largest and directed backward; metathorax rather abruptly truncate behind, lateral margins finely

serrate; flanks of thorax with a broad, deep, polished excavation on posterior half; abdomen ovate, first segment very broad, sessile with base of second and conforming in outline therewith; pygidium smooth and shining; first segment beneath unarmed.

Black, clothed above with short, decumbent, black pubescence; cheeks, face and scape of antennæ with pale glittering pubescence; an oblique stripe on each side of vertex and on lateral margin of thorax above as far as verge of truncation on metathorax, of silvery pubescence; metathorax behind with long pale pubescence; legs and venter piceous or fuscous, shining, clothed with pale pubescence; calcaria whitish; abdomen at base and sides with scattered pale pubescence, second segment with two rather large, longitudinally ovate, opaque yellow or reddish spots; apical middle of segments 3-5 with a spot of silvery pubescence.

Chapada. Easily recognized by the overhanging projection on the front.

43. **M. araxa** ♀.—Length 8-14 mm.—Head transversely quadrate, slightly broader than thorax, posterior angles rounded, carinate; eyes convex, smooth and polished; thorax short, fiddle-shaped, deeply constricted on each side behind the middle; lateral margin of mesothorax with two or three short, obtuse teeth before the constriction; metathorax abruptly declivous posteriorly, the lateral margin serrate, flanks broadly and rather deeply excavated about the middle, smooth and shining; abdomen ovate, first segment broadly dilated posteriorly, sessile with base of second segment and conforming in outline therewith; apical segment above very closely and finely punctured.

Velvety black above; clypeus, cheeks—extending up on each side of vertex obliquely behind the eyes, scape, a stripe on each side of thorax above extending from prothorax almost to apex of metathorax, sides of pro- and mesothorax, a spot above the four posterior coxæ, tufts on each extreme lateral apical margin of abdominal segments 2-5, and a square spot on apical middle of segments 3-5, of pale golden or silvery pubescence; sides of metathorax with long white hair; legs clothed with whitish pubescence, calcaria pale, tarsi often more or less rufotestaceous; second abdominal segment above with two rounded, subopaque yellow or orange-yellow spots, one on each side midway between base and apex; venter sometimes reddish, clothed with whitish pubescence, the segments fringed at apex with rather long whitish hair.

Chapada, Corumbá. At first sight this looks like *projectifrons*, but besides the plain front, the head is not emarginate behind, the thorax is longer, and the pale spots on second abdominal segment are rounded, not oval.

44. **M. turnalis** ♀.—Length 10 mm.—Densely and strongly punctured; head transversely subquadrate, slightly broader than thorax, posterior margin straight, lateral angles rounded and carinate; cheeks unarmed, but sharply carinate beneath; eyes small, rounded, convex, smooth and polished; thorax short, fiddle-shaped, a little longer than broad, broader anteriorly, rather deeply constricted about the lateral middle, with two or three small teeth on lateral margin in front of the constriction; metathorax abruptly truncate behind, the lateral

margins finely serrate; abdomen ovate, first segment broad, sessile with base of second, and conforming in outline therewith; pygidium rugulose at base, smooth at tip.

Black, clothed with black pubescence above; cheeks, face, scape of antennæ, thorax beneath, metathorax behind, and legs, with pale glittering pubescence; an oblique stripe on each side of vertex, and two on thorax above not reaching anterior margin, of silvery pubescence; a silvery sericeous patch on lower margin of flanks of thorax; calcaria whitish; a spot on each side of first abdominal segment at apex, lateral margin of second, and the remaining segments, except a broad median black stripe, of silvery pubescence; second segment with two tolerably large, rounded, punctured, opaque yellow spots; venter with pale pubescence.

Corumbá, Chapada. Very much like *araxa*, but smaller, the thorax shorter and broader, and sides of metathorax not serrate. In *araxa* the sides of the head behind the eyes and the cheeks are pale golden, as well as the broad stripes on the thorax extending the entire length; while in *turnalis* there is an oblique silvery line behind each eye and an abbreviated line on each side of thorax, half way on meso- and metathorax. The sides of first abdominal segment of *turnalis* has a white pubescent spot, and the sides of segments 3–5 are broadly silvery, with a black central stripe; while in *araxa* the first segment has some long pale hairs at base, and segments 2–5 have three silvery stripes, one on the middle and one on each extreme side.

45. **M. curiosa** ♀.—Length 7 mm.—Small, densely, confluently punctured; head transversely quadrate, broader than thorax, scarcely narrowed behind eyes, the posterior angles acute when viewed from above; eyes round, convex, smooth and polished; thorax broad, fiddle-shaped, an acute hooked spine on each side at about the middle; metathorax rounded above, abruptly declivous behind, the flanks deeply excavated, smooth and polished; abdomen ovate, as long as head and thorax together, first segment not nodose, not constricted at apex, but gradually widened posteriorly, and sessile with and conforming in outline with base of second segment; venter shining, sparsely punctured.

Opaque black, head and thorax with erect black hair; mandibles, except tips, ferruginous; clypeus silvery-sericeous; cheeks, an oblique mark behind each eye and meeting on posterior margin of occiput, two longitudinal lines on thorax above reaching to tip of metathorax, but not extending on prothorax, and lower part of flanks of thorax, all clothed with silvery pubescence; legs clothed with pale glittering hair, calcaria whitish; abdomen velvety black, basal segment, as well as apex of metathorax, with pale hair; the sides of abdomen and venter with silvery pubescence; two large ovate ferruginous spots, clothed with cupreous pubescence, on second segment above, a rather broad median longitudinal stripe of silvery pubescence beyond second segment, composed of spots on apical middle of segments 3–5; pygidium pale ferruginous.

Chapada (October). One specimen. This agrees tolerably well

with the description of *plagifera* André, but the head above is ornamented with two oblique silvery lines, and the cheeks and clypeus are also silvery; it may prove to be only a variety.

46. **M. bombycina** ♀.—Length 10 mm.—Head quadrate, broader than thorax, space behind the eyes broad, the cheeks carinate beneath, eyes rounded, convex, polished; thorax fiddle-shaped, anterior angles of prothorax acute, lateral margin of mesothorax irregularly toothed, of metathorax serrate; flanks excavated, smooth and polished; abdomen elongate, the first segment broadly dilated at apex and conforming in outline with base of second segment.

Black, densely clothed with appressed silky brownish ochraceous pubescence, which is silvery in certain lights; when viewed from above there is an obscure silvery spot on each side of the head, and a broad silvery stripe on each side of thorax; legs black, with pale glittering pubescence, calcaria very long and white; on each side of second abdominal segment above, about the middle, two small, round, pale yellow, smooth shining spots, somewhat obscured by the sericeous pubescence; apical segments thickly clothed with silvery pubescence.

Chapada. One specimen. Differs from all the species examined by the uniform pale silky appearance.

47. **M. carinigena** ♀.—Length 7-8.5 mm.—Head very large, quadrate, slightly narrowed posteriorly, broader than thorax, posterior margin deeply emarginate, with acute lateral angles; cheeks on each side beneath with a sharp longitudinal carina, extending to posterior angles above, and ending anteriorly in a blunt tooth; eyes rather small, round, convex, smooth and polished; space behind eyes about equal to width of thorax anteriorly; thorax small in comparison with the head, fiddle-shaped, anterior angles rounded, lateral margin of mesothorax with two or three small teeth, that of metathorax coarsely serrate or spinose; legs slender, middle and hind tibiæ with five or six long slender spines on outer margin, joints of tarsi long and slender; basal segment of abdomen subnodose, dilated posteriorly, the anterior face almost perpendicular, subapical margin not dentate.

Black, with sparse erect black hair, face and cheeks silvery; a longitudinal subobliique stripe behind each eye, and a broad stripe on each side of thorax above, extending to apex of metathorax, silvery pubescent; mandibles dark ferruginous; sides of thorax silvery sericeous; legs fusco-ferruginous, clothed with silvery pubescence, calcaria whitish; a large, rounded, opaque, sanguineous or bright ferruginous spot on each side of second abdominal segment; anterior face of first and sides of the following segments with silvery pubescence; a silvery spot on apical middle of all the segments above; venter fusco-ferruginous, clothed with pale pubescence.

Chapada (April to October). This may prove to be *Mayri* Kohl.

48. **M. Pertyi** Dalla Torra (Catal. Hym., viii, p. 72; *bucephalus* || Smith, Brit. Mus. Cat. Hym., iii, p. 53).— ♀.—Length 10 mm.—Head very large, subglobose, much broader than thorax, densely punctured, posterior angles rounded; cheeks beneath with a sharp longitudinal carina; eyes small, round, convex, shining, minutely netted; thorax above closely punctured, gradually narrowed posteriorly,

not constricted medially, sides sparsely punctured; metathorax obliquely declivous, lateral margin without teeth, anterior angles of mesothorax acute; legs stout, middle tibiæ with two short spines on outer edge and one large spine at tip, the posterior pair have three larger spines on outer edge and a long sharp one at tip; basal segment of abdomen broader posteriorly, subnodose, constricted into a depressed band at apex, before which is a transverse row of six or seven rather large acute teeth.

Black, with erect black hair, face and cheeks silvery; an oblique, rather obscure silvery line behind each eye, confluent on occiput; two rather obscure silvery spots on posterior margin of mesothorax, confluent with the two narrow, silvery, longitudinal lines on metathorax; a triangular silvery spot on each side of thorax above middle coxæ; calcaria pale; sides of basal segment of abdomen and the depressed apical band silvery; a round, smooth, polished, ferruginous spot on each side of disk of second segment above; segments 3–5 silvery, interrupted medially; venter tinged with ferruginous.

Santarem. (February, November). Two specimens.

49. **M. stygia** Smith (Brit. Mus. Cat. Hym., iii, p. 47).—♀.—Length 16 mm.—Head subquadrate, nearly as broad as thorax, and as well as the latter coarsely sculptured; eyes round, strongly convex, smooth and polished; thorax square anteriorly and strongly constricted behind the very prominent subacute lateral tubercle or spine; anterior angles and sides of prothorax strongly tuberculate; metathorax abruptly truncate behind, the flanks rugose, shining; abdomen oblong-ovate, first segment sessile with base of second, its upper surface narrow and depressed, sparsely covered with short longitudinal carinæ or ridges, its anterior face broadly flattened; second ventral segment deeply and coarsely and apical segment finely punctured.

Black, opaque, the pubescence coarse and entirely black; second segments above with a medium sized, rounded, polished, reddish-yellow spot on each side of disk, and a silvery pubescent spot on each side of basal segment at apex above, sometimes obsolete or wanting, and also on each side of segments 3–6 above; lateral margin of second segment beneath and apical margin of that and remaining segments fringed with whitish pubescence; calcaria pale; one specimen has faint indications of two pale stripes on metathorax and a spot on each side of mesothorax at base.

Santarem. Two specimens. Probably the same as *fenestrata* Klug. Specimens will probably occur without any pale markings except the two rounded, dull reddish yellow spots on second segment. The shape of the thorax and of first segment of abdomen is much as in *myops* Burm., except that the sides of the thorax are more prominently spinose. Closely resembles *serena* Gerst., which, however, has the sides of the apical segments of the abdomen broadly golden pubescent; otherwise the two species are very much alike.

50. **M. myops** Burm., (Brasil, Mutill., 1854, p. 6).—♀.—Length 11–19 mm. —Form robust, black; head not broader than thorax, transversely subquadrate;

anterior angles of thorax spinose, and on each side at base of mesothorax a prominent subacute spine; first segment of abdomen broad at apex, anterior face flat, the apex depressed, band-like, with a subapical row of short obtuse teeth; two short longitudinal lines on vertex over eyes, two slender stripes on posterior half of thorax, lower portion of flanks, sides of first abdomen segment, two stripes on apical half of abdomen, beginning on apical margin of second segment, and extreme lateral margin of the segments, silvery ochraceous pubescent; legs and venter with short and long pale pubescence, more dense on apical margin of second and following segments; second segment above covered with rows of short longitudinal carinæ, and with two rather large, transversely rounded, reddish-yellow, shining spots behind the middle; calcaria pale.

Chapada. Common. This closely resembles *perspicillaris* Klug, which, however, has the head larger and more convex, with two large, rounded, pale spots on vertex; the thoracic vittæ are broadly interrupted at base of mesothorax; the two shining red spots on second abdominal segment are larger and rounded, not transverse, and instead of the two slender stripes on the apical segments, seen in *myops*, segments 3–6 are silvery white, with a broad central black stripe; there are no pale pubescent spots on apical margin of second segment.

51. **M. infausta** ♀.—Length 20 mm.—Large, robust; head subquadrate, nearly as broad as thorax, coarsely punctured; eyes rounded, very convex, smooth and polished; thorax square anteriorly and strongly constricted behind the prominent, subacute, lateral tubercle or spine; anterior angles of the thorax tuberculate; metathorax abruptly declivous posteriorly, the sides rugose, shining; abdomen ovate, first segment sessile with base of the second, depressed above, anterior face of the segment broadly flattened, with the upper margin spinose; second segment covered with short longitudinal carinæ; apical segment finely punctured.

Black, opaque, with black pubescence; mouth, cheeks, under surface of body and legs with whitish pubescence; a narrow, uninterrupted silvery stripe on each side of thorax above, extending to apex of metathorax, but not quite reaching anterior margin of thorax; a silvery-white patch on lower portion of flanks of metathorax; calcaria pale; a stripe on each side of first abdominal segment, and a narrow stripe on each side of abdomen beginning at apex of second segment and extending to apical segment, all of white pubescence; second segment above with a narrow, transverse, somewhat oblique, polished, dull yellowish spot on each side of disk; sides of second segment beneath and apical margin of that and the following segments fringed with white pubescence.

Minas, Car. Two specimens. Much the same form as *myops*, but larger, head entirely black, the white pubescent stripes on thorax extended forward and reaching nearly to anterior margin of prothorax, and the two smooth spots on second abdominal segment are slender and transverse, like those of *indica*.

52. **M. bellula** ♀.—Length 10–13 mm.—Head narrower than thorax; eyes rounded, very convex, smooth and polished; thorax quadrate anteriorly, rapidly narrowed posteriorly, longer than broad; metathorax abruptly truncate behind, lateral margin serrate, flanks excavated and tuberculate above; abdomen ovate, first segment very broad, sessile with base of second segment, scarcely constricted at tip, the apical margin narrowly depressed like a band, anterior face of the segment broadly flattened; second segment above covered with rows of short, longitudinal carinæ; apical segment finely punctured.

Black, opaque, pubescence coarse and black, that on face, cheeks, under surface of body and legs silvery white; a broad stripe on each side of head above, a narrow uninterrupted stripe on each side of thorax above, extending from anterior margin of prothorax to apex of metathorax, spot on each side of basal segment of abdomen and sides of segments 3–5, all of silvery-white pubescence; lower portion of flanks of metathorax silvery; second segment of abdomen above with an oblique yellow spot on each side of its middle portion; calcaria white.

Chapada. (April to November). This may be *obliquata* Klug, but the head above has two silvery stripes and those on the thorax are entire.

53. **M. larvata** Klug (Nova Acta Cæss. Cur. Nat., x, p. 310, pl. xxii, fig. 6).—♀.—Length 17 mm.—Form robust; head large, quadrate, not broader than thorax, broad behind eyes, lateral posterior angles rounded, the sides beneath sharply carinate, unarmed; eyes small, round, very convex; thorax rather short, coarsely sculptured, fiddle-shaped, constricted in front of the prominent metathoracic spiracles, anterior angles acute, a long acute incurved spine on each side of mesothorax immediately in front of the constriction; metathorax rounded above, abruptly declivous behind, where the surface is depressed and almost smooth, lateral margin subserrate, the flanks beneath the constriction deeply transversely excavated, smooth and polished; legs robust, tibiæ strongly spined; abdomen ovate; first segment short and broad, anterior face broad and flat, the apex depressed band-like, sessile with base of second segment and serrate anteriorly; second segment sparsely covered with short longitudinal carinæ, the two rounded nude spots shining, not large, placed slightly behind the middle, and having a few scattered short longitudinal carinæ on their surface; apical segment not flattened, roughened at base; second ventral segment strongly and sparsely punctured, pinched and longitudinally carinate on basal middle.

Velvety black, the pubescence short and black, with longer scattered black hair; a round spot behind each eye, another on each side of mesothorax posteriorly, a short stripe on each side of metathorax at base, lower margin of flanks, a transverse spot on each side of first abdominal segment at apex, a broad stripe on extreme lateral margin of second segment, and a band or spot on each side of segments 3–5, all of dense appressed silvery-white pubescence; legs with pale pubescence, calcaria white; the two smooth spots on second abdominal segment above pale yellowish; apical margin of ventral segments 2–5 narrowly silvery and fringed with white pubescence.

Santarem. Two specimens.

54. **M. spinosa** Swed. (Klug, Nova Acta Cæs. Nat. Cur. x, p. 309, pl. xxii, fig. 4).— ♀.—Length 18 mm.—Head subquadrate, not broader than thorax, extended behind the eyes about their diameter, posterior angles rounded, posterior margin of cheeks sharply carinate; eyes small, rounded, polished, very convex; thorax shaped much as in *larvata*, and when viewed from above each side appears to have four obtuse spines, including the prominent stigmatic tubercles, the one on anterior angles of prothorax acute, that between the two spiracles longer, obtuse and most prominent; metathorax coarsely punctured, the stigmatic tubercles spiniform; abdomen formed and sculptured as in *larvata*.

Velvety-black, the pubescence black and suberect; a spot on the front between the eyes, clypeus, lateral posterior margin of mesothorax, metathorax except median black stripe, flanks, sides of first abdominal segment broadly, and segments 3 and following except a rather broad central stripe, all of dense appressed pale golden pubescence; second segment above with two large ovate shining orange-ferruginous spots, almost meeting on the disk; calcaria pale; legs and venter clothed with pale golden sericeous pubescence, more dense on coxæ and apical margin of segments 2–5.

Rio de Janeiro (November). Two specimens.

55. **M. frigidula** ♀.—Length 8 mm.—Slender; head transverse, narrowed behind eyes, which are unusually large, rounded, convex and polished; thorax coarsely and densely sculptured, slightly narrower than head, gradually narrowed posteriorly, the metathorax obliquely declivous, and at the summit at base a short, smooth, transverse carina, and on each side a rather long longitudinal groove; lateral margin of thorax not toothed or serrate; legs rather stout; abdomen with first segment nodose, beyond which it is oblong-ovate, the second segment depressed, closely deeply punctured, the apical margin shining; beneath, the second segment is sparsely punctured and shining.

Black, the entire insect above has, in certain lights, a frosty appearance from the pale glittering pile, which is more dense on head, sides of thorax, legs, apex of first segment of abdomen and on segments 3–5; apical segment with long pale hair; second segment with two large irregular pale yellowish spots, margined with brown-ferruginous; calcaria short, stout, pale.

Santarem. One specimen.

56. **M. bellica** ♀.—Length 8.5–10.5 mm.—Rather slender; the head and thorax coarsely sculptured; head transverse, not broader than thorax, the space behind eyes narrow; eyes prominent, convex, polished; thorax slightly narrowed in front, gradually so behind, the lateral margin not constricted, unarmed, the metathorax rounded behind; legs slender; abdomen ovate, first segment nodose, second segment above finely and densely punctured, the smooth pale spots sparsely punctured and polished; second segment beneath sparsely punctured and shining.

Deep black, opaque, the pubescence black; flanks of metathorax with silvery sericeous pile; calcaria white; the two smooth spots on second abdominal segment longitudinally ovate, pale yellow; a silvery pubescent spot on apical middle of segments 3–5; extreme sides of segments 2–4 with silvery hair; venter with sparse, pale, glittering hair, more dense on apical margin of segments 2 and 3.

Chapada. This species is deep opaque black, except the two oblong ovate yellow spots on second segment and the silvery stripe on middle of apical segment.

57. **M. diophthalma** Klug (Nova Acta Cæs. Nat. Cur., x, p. 318, pl. xxiii, fig. 6).—♀.—Length 10-13 mm.—Slender; head transverse, as broad as thorax: eyes rounded, very convex; thorax gradually narrowed to apex which is subcompressed, longitudinally rugose, lateral margin unarmed, anterior angles not acute; abdomen deeply, rather sparsely punctured; first segment subnodose and subconstricted at apex, the two nude shining rounded spots on second segment with a few sparse deep punctures; second ventral segment polished, sparsely punctured, convex at base.

Velvety black, the pubescence black, erect or suberect and scattered; a band between the eyes, a stripe on each side of meso- and metathorax above, broad on the former, lower half of flanks, a spot on each side of basal segment of abdomen above, extreme lateral margin of second segment, a spot on lateral apical corner of segments 2-4, and a spot on apical middle of segments 2-6, small on 2, all of pale golden or silvery pubescence; the two nude spots on second segment above yellowish; legs with pale glittering pubescence; calcaria pale; ventral segments 2-4 fringed at apex with pale pubescence.

Santarem; Chapada (April). A specimen from Chapada has no pale band on the head, and is larger; otherwise there appears to be no difference.

58. **M. bellicosa** ♀.—Length 9-10 mm.—Form and sculpture of *bellica*, except that the second segment of abdomen is more coarsely punctured and the eyes more prominent.

Black, with short black pubescence; head with golden pubescence above, paler on sides; a pale golden pubescent stripe on each side of thorax above, not reaching prothorax; lower part of flanks silvery, the upper part smooth and polished; legs with pale glittering pubescence, calcaria white; a spot on disk of first segment of abdomen and on apical middle of the second, silvery pubescent; second segment above with two large elongate shining blood-red, sparsely punctured spots, narrowed anteriorly and reaching the basal margin; apical segments with pale glittering pubescence, extreme sides of second and following segments, as well as the venter, with silvery pubescence.

Chapada. This is larger than *bellifera* to which it is allied; the head, however, is golden, and the first segment of the abdomen above has a pale spot on disk and another on apical middle of second; the red spots on second segment have the sides less parallel, while the black stripe does not extend beyond the silvery spot on apex of the segment.

59. **M. bellifera** ♀.—Length 6-7 mm.—Form rather slender; head as broad as thorax, transverse; eyes subovate, prominent, convex, approaching pos-

terior margin of head, but placed at some distance from base of mandibles; thorax elongate, sides parallel anteriorly, but gradually narrowed posteriorly and subcompressed, sides unarmed; metathorax rounded posteriorly and abruptly declivous; abdomen ovate, first segment subnodose, not distinctly denticulate before apex; second segment convex, sparsely punctured and shining, except the black median stripe which is opaque; venter sparsely and finely punctured.

Black, with scattered erect black hair; head silvery pubescent, except a spot behind eyes and a large spot on top of vertex, which are brown; mandibles ferruginous, tips black; thorax above with a broad silvery pubescent stripe on each side, extending from anterior margin to apex of metathorax, where it is narrowed; flanks densely silvery except upper margin which is nude and shining; legs with silvery sericeous hair, calcaria white; abdomen with apex of first segment white, apical margin of segments 2–5 fringed with silvery pubescence, interrupted medially on these segments above; second segment with two elongate, rather broad, parallel, smooth, shining, ferruginous spots, extending from basal margin, where they are narrowed, nearly to apical margin of the segment; when viewed from above, a deep black opaque stripe extends from base of second segment, where it is broadest, to apex of the abdomen; sides of second segment sometimes brown or brown-ferruginous; apical segment black, silvery at sides; venter brown. In one specimen the second segment is orange-ferruginous, except the opaque black stripe on middle above, and the head and thorax are tinged with dull red.

Chapada. This may be a variety of *lusca* Klug, but the ornamentation of the abdomen seems different. Compared with Klug's figure, the spots on second segment of abdomen are more parallel, the inner margin being straight and not sinuate, and not inclined to become confluent; while the black median stripe extends from base of second segment to apex of the abdomen without interruption.

60. **M. latevittata** ♀.—Length 5–13 mm.—Subrobust; head transverse, slightly narrower than thorax; eyes small, convex, polished, placed near to posterior margin of head; thorax elongate, square in front, gradually narrowed behind the middle, the metathorax rounded behind and abruptly declivous, sides of thorax unarmed; abdomen ovate, convex, first segment depressed, scarcely constricted at apex; pygidium longitudinally aciculate; venter rather closely punctured.

Velvety black, with long, scattered, erect black and pale hair; head densely silvery, tinged with golden above, sometimes a black spot or line near posterior margin of vertex; scape silvery; thorax above with a broad silvery pubescent stripe on each side extending from anterior margin to apex of metathorax; flanks with dense silvery pubescence, except upper margin posteriorly, which is nude, smooth and polished; legs with silvery pubescence, calcaria white; abdomen velvety black, with long pale hair at base and sides; first segment with a small silvery spot, sometimes wanting, on each side at apex; second segment with a transverse, slightly oblique, smooth, yellow spot or each side towards apical margin, and generally a more or less distinct, smooth, yellow spot on each side on basal margin, varying in shape from elongate to a mere dot, or obsolete; a silvery pubescent spot on apical middle of segments 2–5, the lateral apical mar-

gin of these segments densely fringed with silvery pubescence; apical segment sometimes entirely black, the pubescence at the sides generally more or less pale; venter with long thin pale hair, more dense on apical margin of segments.

Chapada. Common. Closely resembles *demissa;* but that species has no silvery spot on apical middle of segments 2 and 3; the smooth spots towards apex of second segment in that species are transversely square, not at all oblique, and are of a blood red color.

61. **M. demissa** ♀.—Length 4-8 mm.—Very much like *laterittata*, but differs as follows: the head is more golden, the pubescence more dense, the sides of first abdominal segment is broadly silvery, the two smooth spots towards apex of second segment are transversely quadrate, not at all oblique, and blood-red in color; the two spots on basal margin are either very small or entirely wanting; only segments 4 and 5 have a silvery pubescent spot on apical middle above.

Chapada.

62. **M. atripes** Smith (Brit. Mus. Cat. Hym., iii, p. 45).—♀.—Length 15–20 mm.—Head and thorax rugose; head not broader than thorax, cheeks longitudinally carinate; eyes rounded, very convex; thorax elongate, narrowed and subcompressed posteriorly, slightly narrowed anteriorly, the anterior angles subacute; lateral margin dentate, rather deeply notched on each side in front of the prominent stigmatic tubercles, and anterior to the notch a prominent obtuse tubercle; metathorax rounded above; the flanks transversely excavated beneath the notched sides; the first abdominal segment transversely nodose and subconstricted at apex; second segment above with scattered punctures, the nude spots polished and rounded or subquadrate, the basal two smaller; second ventral segment deeply and sparsely punctured, polished.

Opaque velvety-black, with black pubescence; the extreme lateral margin of second abdominal segment, a spot on lateral apical corners of segments 2–4 and a narrow line on apical middle of segments 4 and 5, pale golden or silvery pubescent; legs with black pubescence, calcaria fuscous or black; the four nude spots on second segment above orange-ferruginous or dark red.

Santarem; Mararu (April). Probably the same as *4 pustulata* Klug.

63. **M. 4-notata** Klug (Nova Acta Cæs. Nat. Cur., x, p. 316, pl. xxiii, fig. 3). —♀.—Length 16-20 mm.—Slender; head transverse; not broader than thorax; eyes rounded, very convex; thorax elongate, gradually narrowed to apex, deeply notched on each side of mesothorax posteriorly, anterior to which is a prominent obtuse spine, the metathoracic stigmatic tubercles prominent; the metathorax rounded above; subcompressed laterally; first abdominal segment small, narrow, nodose and subconstricted at apex; second segment with the four nude shining spots irregularly rounded or subquadrate, sparsely punctured, the posterior pair very large, the anterior pair smaller; second ventral segment shining, sparsely and deeply punctured, slightly pinched and longitudinally carinate on basal middle, the basal segment with a prominent median carina.

Black, with erect black pubescence; the scape golden sericeous; a band across

mesothorax posteriorly, metathorax except a broad black median stripe and a slender one on either side of it, flanks of metathorax, coxæ, spot on each side of first abdominal segment, lateral margin and apical corners of second segment, spot at sides of segments 3–5, triangular spot on apical middle of 4 and 5, sometimes a dot on apical middle of 2 and 3, most of apical segment, and apical margin of ventral segments 2–5, all densely golden ochraceous pubescent: second segment above with four nude orange-yellow spots; calcaria pale; legs and venter clothed with pale golden ochraceous pubescence.

Rio de Janeiro (November); Minas, Car.; San Salvador, Pernambuco (August).

64. **M. inermis** Klug (Nova Acta Cæs. Nat. Cur., x, p. 317, pl. xxiii, fig. 4). —♀.—Length 13–15 mm.—Head transverse, as broad as thorax, subquadrate when viewed in front; eyes small, round, convex and polished, placed near posterior margin of head, but widely removed from base of mandibles; thorax subquadrate anteriorly, gradually narrowed behind mesothorax, sides unarmed; a short deep groove with carinate edges on each side at base of metathorax, the latter rounded above and obliquely declivous behind; first segment of abdomen small, subnodose, the second large, convex, the smooth spots sparsely punctured and shining, as is also the segment beneath.

Velvety black; head and anterior half of thorax entirely black with black pubescence; posterior margin of mesothorax, confluent with two broad stripes on metathorax, and the flanks, entirely pale golden pubescent; the legs with pale golden pubescence, calcaria pale; sides of segments 2 and 3, and the whole of segments 4 and 5, pale golden; second segment with two very large, irregularly rounded, smooth orange-ferruginous spots a little behind the middle, and two smaller spots of same color on basal margin; venter with sparse pale hair, fringed at apex of segments 2–4.

Rio de Janeiro; Minas, Car. Four specimens. Resembles *4-notata* Klug, but the thorax is unarmed. I had named this handsome species *optabilis*, all the specimens having the head entirely black and the two red spots on posterior part of the second abdominal segment much larger than represented in Klug's figure, and quite as large as those in *4-notata;* they, however, do not differ from a specimen, labelled *inermis* Klug, kindly sent me by Mr. Ernest André.

65. **M. dorsovittata** ♀.—Length 10 mm.—Head small, transverse; eyes small, round, convex, finely netted; thorax with large coarse punctures, subcompressed and gradually narrowed posteriorly, anterior angles rounded, sides not dentate; abdomen ovate, with large deep punctures on second segment, which is gibbous at base above; first segment small, narrow, quadrate, depressed; apical segment finely longitudinally aciculate.

Velvety black, with long erect or suberect black hair; head in front and cheeks golden ochraceous; a narrow stripe on disk of thorax extending the entire length, the flanks except upper margin, a spot on first abdominal segment

above, a quadrate spot on disk of segments 4 and 5, and a spot on extreme sides of segments 2 and 3 at apex, all of dense ochraceous pubescence; two large rounded, almost contiguous, dark red, shining spots on middle of second segment above, and two smaller elongate oblique spots of same color at base, nearly confluent with the larger ones; sides of apical segments and beneath with long pale hair; legs with ochraceous pubescence and long pale hair on femora, calcaria black.

Brazil (no definite locality). One specimen. Same form as *centrovittata* (No. 35), but separated at once by the large shining red spots on second segment of abdomen. Closely related to *virginalis* Gerst.

66. **M. quadrum** Klug (Nova Acta Caes. Nat. Cur., x, 320, pl. xxiii, fig. 8). ♀.—Length 10-11 mm.—Small, coarsely rugose; head transverse, not broader than thorax, posterior lateral angles acute, posterior margin of cheeks carinate; eyes rounded, very convex, polished; thorax ovate, narrowed behind the middle, the metathorax rounded above, abruptly declivous behind, flanks flat, smooth and polished; prothorax tuberculate on anterior lateral margin; sides of pro- and mesothorax coarsely irregularly serrate, not notched; first abdominal segment transversely nodose and constricted at apex; the four nude spots on second segment above shining, deeply and sparsely punctured, the apical pair large and rounded, those at base smaller, ovate, but never minute, these spots sometimes almost confluent laterally; apical segment finely granulated; second ventral segments deeply punctured, not pinched at base, the first segment with a prominent compressed tooth on middle.

Black, opaque, the pubescence black; head, broad stripe on sides of thorax its entire length, lower margin of pleura, a dot on sides of first abdominal segment, extreme lateral margin of second segment, line on lateral apical margin of segments 2-5, and spot on apical middle of same, all griseous or silvery pubescent; antennæ and legs with pale glittering pubescence; calcaria pale; the four nude spots on second segment above sanguineous; venter black, sometimes more or less tinged with rufo-castaneous; the pubescence silvery, dense on apical margin of the segments.

Chapada.

67. **M. chapada** ♀.—Length 10-13 mm.—Much the same form as *latevittata*, but with the metathorax less gibbous, being obliquely declivous posteriorly, and the sides of thorax more abruptly narrowed behind; apex of first segment of abdomen more constricted and band-like, with subapical margin serrate.

Velvety black, with scattered erect black hair; those on mouth parts brown; head generally with a longitudinal tuft of fulvous or golden pubescence on vertex, sometimes wanting; a rather broad fulvous or dark golden pubescent stripe on each side of thorax above, commencing at posterior margin of prothorax and extending to apex of metathorax, where it is paler; lower margin of flanks densely silvery pubescent, upper portion nude and polished; base of legs and femora with long pale hair, longer on under side; tibiæ and tarsi with black pubescence, more or less pale on the under side of tibiæ; calcaria pale; a spot or

stripe on each side at apex of first abdominal segment, a spot on apical middle of segments 2–5, forming a stripe, a double line on extreme sides of segment 2, a spot on sides at apex of segments 2 and 3, and fringe on apical segment, all of silvery pubescence; a small, more or less oblique, subpyriform, smooth, polished, yellow, rarely reddish, spot on each side of second segment towards apex, and two narrow longitudinal spots of same color at base, placed opposite to the silvery stripes on first segment; venter shining, with apical margin of segments 2 and 3, sometimes 4, fringed with whitish pubescence; apical segment with black pubescence.

Chapada. Common. Recognized by the fulvous stripes on thorax, and by the two posterior pale shining spots on second abdominal segment being more or less oblique and subpyriform.

68. **M. crixa** ♀.—Length 9–13 mm.—Differs from *chapada* as follows: vertex with a transverse line or spot of silvery pubescence between the eyes; stripes on thorax above narrower, silvery pubescent, and extending only a short distance forward on the mesothorax; pubescence on legs mostly pale; the smooth shining red or yellow spots on second abdominal segment larger and broader, the two posterior ones subquadrate or rounded, not oblique; the extreme lateral margin of segment 4 has a silvery pubescent spot as well as 2 and 3.

Chapada. Common.

69. **M. compar** André (Bull. Soc. Ent. de France, 1895, p. cccxxi).—♀.—Length 10–13 mm.—Much like *crixa*, but differs as follows: the vertex has a silvery subarcuate band from eye to eye; the slender silvery stripes on thorax generally extend forward nearly or quite to prothorax; the two smooth orange-red spots on base of second segment of abdomen are round, not elongate, and those on posterior part transversely quadrate or rounded and placed closer together; segments 4 and 5 only have a silvery pubescent spot on apical middle.

Corumbá.

70. **M. vagabunda** Smith (Descr. New Spec. Hym Brit. Mus., 1879, p. 214). ♀.—Length 11–14 mm.—Rather slender; head transverse, not broader than thorax; eyes round, prominently convex; thorax elongate, considerably narrowed behind the middle, slightly notched in front of the metathoracic spiracles; metathorax rounded above, not abruptly declivous behind, subcompressed and flattened laterally, the lateral edges subserrate; first abdominal segment small, transversely subnodose and subconstricted at apex; the four small, smooth, raised spots on second segment above polished and with a few scattered punctures, the apical spots transverse, those at base narrow, longitudinal; apical segment longitudinally striated; first ventral segment with a prominent, compressed, truncated, dentiform carina on middle, second segment with large deep scattered punctures.

Velvety black, the pubescence very short, appressed and black; a spot on vertex, two narrow stripes on metathorax extending slightly on base of mesothorax, a stripe on lower margin of flanks, a spot on apical corners of first abdominal segment, extreme lateral margin of second, spot on lateral apical corners of segments 2–4, and spot on apical middle of 2–5, forming a central longitudinal

stripe, all silvery-white pubescent; apical segment more or less yellowish pubescent; legs with black pubescence, slightly mixed with pale, calcaria pale; the four nude spots on second segment above yellow or orange-yellow; venter fringed at apex of the segments with pale pubescence.

Chapada. This may not be correctly determined, although it agrees tolerably well with Smith's description.

71. **M. spectabilis** Gerst. (Archiv. f. Naturg., xl, 1873, p. 73).— ♀.—Length 13–16 mm.—Same form as *graphica* Gerst. (No. 80), but differs as follows: the cheeks up as far as the eyes are silvery pubescent, and a subarcuate silvery or pale golden band on vertex from eye to eye; the silvery ochraceous pubescent stripes on thorax do not reach the posterior margin of prothorax and are not interrupted at base of metathorax; the pubescence of the legs is mostly pale, while in *graphica* it is mostly black, except on coxæ and femora beneath; abdomen beneath more thickly clothed with whitish pubescence; the smooth spots on second segment above are often more or less red or orange-red; otherwise the two species are very much alike.

Chapada. Common. Compared with *compar* André, this species is larger, and segments 2–5 have each a silvery pubescent spot on apical middle.

72 **M. bivittata** Gerst. (Archiv. f. Naturg., xl, p. 72).— ♀.—Length 15–16 mm.—Head transverse, not broader than thorax; eyes rounded, convex, polished; thorax rounded on sides anteriorly, gradually narrowed to apex, unarmed, the anterior margin straight, the lateral angles obtuse, sides notched immediately in front of the metathoracic spiracles; metathorax rounded above, rather abruptly declivous behind, the flanks excavated and polished; first abdominal segment small, transverse and subnodose at apex; the four nude spots on second segment above transversely rounded, sparsely punctured, the anterior pair smaller, ovate; apical segment longitudinally rugose; first ventral segment with a prominent truncated carina on middle, the second segment deeply and sparsely punctured, and subcarinate on basal middle.

Velvety black, the pubescence black; two narrow stripes on head between the eyes, a narrow continuous stripe on each side of thorax, extending from near anterior margin of mesothorax to apex of metathorax, lower portion of flanks of metathorax, spot on each side of first abdominal segment, extreme lateral margin of second, a spot on lateral apical margin of segments 2–4 and sometimes 5, and a spot on apical middle of 3–5 forming a central stripe, all dense silvery-white pubescent; cheeks and legs with scattered pale glittering pubescence, that on four posterior tibiæ more or less black; calcaria pale; the nude shining spots on second segment above orange-ferruginous; the venter with pale pubescence, dense on apical margin of segment 2–4.

Chapada.

73. **M. estrella** ♀.—Length 12–14 mm.—Very closely allied to *bivittata*, but at once separated by the thorax not being notched before the metathoracic

spiracles; the four nude spots on second segment above are smaller and pale yellow, the posterior pair rounded and not at all transverse; otherwise much the same.

Corumbá. This agrees with Gerstaecker's description of *bivittata* quite as well as the preceding species, except in the shape and color of the nude spots on the second abdominal segment, no mention being made of the notch on sides of thorax.

74. **M. duplicata** Gerst. (Archiv. f. Naturg., xl, p. 72).— ♀.—Length 14–16 mm.—Same form and sculpture as *bivittata*. Black, the pubescence black; head ochraceous above, with a broad central black stripe; mouth and cheeks with pale ochraceous pubescence; mesothorax with a broad oblique stripe on each side, a narrow stripe on each side of metathorax, and a large spot on lower margin of flanks, dense ochraceous pubescent; legs clothed with ochraceous pubescence, calcaria pale; first abdominal segment at sides, double line on extreme side of second segment, spot on lateral apical corners of segments 2–4, and a spot on apical middle of segments 2 or 3–5, silvery-ochraceous pubescent; second segment above with four dark sanguineous, smooth, shining, sparsely punctured spots, the posterior pair rather large, somewhat transversely subquadrate, the basal pair smaller and rounded; venter with apical margin of segments 2–4 densely fringed with silvery pubescence.

Sao Joao do Monte Negro. Two specimens. The ochraceous pubescent stripe on mesothorax is shaped much as in *æmulata*, but in that species it is continuous with that on metathorax.

75. **M. ocellaris** Klug (Nova Acta Cæs. Nat. Cur. x, p. 321, pl. xxiii, fig. 9). ♀.—Length 3–6 mm.—Small, form much the same as in *demissa* (No. 61), which it very much resembles, but may be separated as follows: the head above has a large black median spot; the two posterior red spots on second abdominal segment above are large and rounded, not transverse, and there are two oblique ovate spots at base (sometimes mere dots in *demissa*), and there is a short silvery-pubescent stripe on apex of abdomen, composed of a spot on apical middle of segments 3–5.

Chapada. Two specimens.

This and the eight preceding species, having the head more or less ornamented with silvery pubescence, closely resemble each other in the markings of the thorax and abdomen, and may be separated as follows:

Thorax with fulvous or golden pubescent stripes .....67. **chapada.**
Thorax with two silvery or pale ochraceous pubescent stripes.
  Head black, with a pale pubescent spot on vertex between the eyes.
    Second segment of abdomen with the red or yellow spots subquadrate and the basal ones elongate-ovate; lower part of flanks of thorax broadly silvery pubescence..... .....68. **crixa.**

Second segment with apical spots smaller, transverse, the basal ones linear; lower part of flanks of metathorax narrowly silvery pubescent. 70. **vagabunda.**

Head black, with a transverse or arcuate silvery pubescent band between the eyes.

Abdomen above with a silvery pubescent spot on apical middle of segments 4 and 5 only ..... 69. **compar.**

Abdomen above with a silvery pubescent spot on apical middle of segments 2–5 forming a central stripe ..... 71. **spectabilis.**

Head with two suborbital silvery or golden pubescent stripes.

Thorax notched on each side about the middle.

Stripes on mesothorax broad, oblique, not continuous with slender stripes on metathorax ..... 74. **duplicata.**

Stripes on mesothorax slender, straight and continuous with those on metathorax ..... 72. **bivittata.**

Thorax not notched laterally.

Thoracic vittæ narrow, not reaching anterior margin of thorax; spots on second abdominal segment yellow ..... 73. **estrella.**

Thoracic vittæ broad, reaching anterior margin of thorax; spots on second segment sanguineous ..... 75. **ocellaris.**

76. **M. indica** Linn.=*diadema* Fabr. (Klug, Nova Acta Cæs. Nat. Cur., x, p. 314, pl. xxii, fig. 12).—♀.—Length 16–18 mm.—Head and thorax rugosely punctured; head transverse, not broader than thorax; eyes small, round, convex; thorax gradually narrowed posteriorly, the stigmatic tubercles prominent, and immediately in front of the metathoracic spiracles the sides are broadly notched, and between the notch and the anterior tubercles they are obtusely rounded and subserrate; metathorax rounded above and sloping rapidly to apex, the flanks rugosely punctured on upper portion; apex of first abdominal segment transversely subnodose, nearly as broad as base of second segment, subconstricted at tip; the nude polished spots on second segment above linear, those at base longitudinal, the apical two transverse; first ventral segment with a strong acute tooth on middle; second segment deeply and unevenly punctured, longitudinally carinate on basal middle.

Velvety-black, the pubescence short, dense and appressed, except a few scattered erect hairs; a silvery-white pubescent, arcuate band on vertex from eye to eye; cheeks with silvery pubescence; a slender silvery pubescent band on each side of metathorax and extending about half way up on mesothorax; lower portion of pleura silvery-white pubescent; legs with pale glittering pubescence, calcaria pale; a spot on each side of first abdominal segment at apex, extreme lateral margin of second segment, a spot on lateral apical corners of segments 2–4, and a spot on lateral middle of 2–6, forming a central stripe, all silvery-white pubescent; the four linear nude spots on second segment pale yellow; venter with pale glittering pubescence, the apical margin of segments 2–4 fringed with silvery pubescence.

Pará; Benevides (July).

77. **M. solemnis** ♀.—Length 20 mm.—Rather slender; head not broader than thorax, transverse; eyes small, round, convex, placed about half their di-

ameter from posterior margin of head, and twice that distance from base of mandibles; cheeks and thorax at sides coarsely reticulated; thorax elongate, narrowed posteriorly, the metathorax rounded behind; the stigmatic tubercles prominent, forming, with the large tooth on each side about the middle, three obtuse prominent tubercles; abdomen long, ovate, first segment subquadrate, subnodose, almost as broad as base of second segment, subconstricted at apex, the four narrow smooth polished lines on second segment impunctate; second ventral segment deeply but not closely punctured.

Velvety black; head with a small arcuate pale golden line on disk above; a narrow silvery pubescent stripe on each side of thorax above, straight on metathorax, but curved outwardly and broadened forward of posterior tubercle, but not reaching the prothorax; viewed laterally the stripe is regularly arched; flanks of metathorax with lower half silvery; legs with scattered pale pubescence; calcaria black; sides of first segment silvery, and a silvery spot on apical middle and on extreme sides of segments 2–5, forming three stripes, one on middle and one on each side; sides of second segment with a double line of pale pubescence; on the apical third of second segment two narrow, transverse, smooth, polished, dull yellow lines, nearly meeting on disk, and at base two narrow longitudinal lines of same color, each placed opposite the silvery spot on sides of first segment, and reaching nearly the middle of the segment; apical segment with a yellowish pubescent spot on middle; venter with segments 2–4 fringed at apex with pale pubescence.

Minas, Car. This is much like *indica*, but easily separated by the prominent subacute tooth on each side of the thorax (between the two stigmatic tubercles which are also prominent), not seen in *indica;* the pale thoracic stripes are broader and dilated anteriorly, and the smooth pale transversely linear spots or lines on second segment of abdomen are longer and more slender; while the calcaria are black. In *indica* the head has a broad conspicuous arcuated silvery pubescent band from eye to eye.

78. **M. aemulata** ♀.—Length 20–22 mm.—Same form as *graphica* Gerst. Velvety black; cheeks up as far as the eyes silvery or pale golden pubescent; an arcuate band on vertex from eye to eye of golden pubescence; thorax with two broad golden or fulvous pubescent stripes, broadened on each side of mesothorax, slightly curved and narrowed to a point on prothorax; lower margin of flanks densely pale golden pubescent; the legs with pale pubescence, black at tips of femora; calcaria pale; sides of first abdominal segment pale golden pubescent; two narrow, longitudinal, smooth polished, yellow spots at base of second segment, and two narrow, transverse, almost contiguous spots of same kind and color, slightly recurved on discal end, near apex of this segment; a spot on apical middle of segments 2–5, a spot on extreme sides of 2 and 3, and sometimes obscurely on 4, lateral margin of segment 2 and apical margin of ventral segments 2 and 3, all of pale golden pubescence; apical segment above pale golden, black on the sides.

Chapada. A larger and stouter species than *indica*, and easily

distinguished by the pubescent stripes on thorax being golden and broadened on each side of mesothorax, where they are slightly curved inward and narrowed to a point on prothorax; the subapical transverse smooth yellow spots or lines on second segment of abdomen above are rather broader and slightly turned up on the inner ends; the abdomen beneath has only two whitish pubescent bands.

79. **M. vivata** ♀.—Length 10–14 mm.—Head transversely subquadrate, broader than thorax; eyes small, smooth, convex, removed from posterior margin quite their diameter; face broad, cheeks carinate but not toothed; thorax short, broad in front, narrowed behind mesothorax, sides not constricted or notched, metathorax round and abruptly declivous behind; upper half of flanks of metathorax flat, smooth and shining; abdomen short ovate, first segment subnodose, depressed above, the apex narrowly constricted; the smooth spots on second segment sparsely punctured, shining; pygidium finely longitudinally aciculate; second ventral segment strongly and sparsely punctured, shining.

Velvety black, pubescent, with scattered, erect black hair, sides of face and base of mandibles with pale pubescence; a slender silvery pubescent stripe on each side of thorax above, reaching from apex of metathorax nearly to anterior margin of prothorax; lower margin of flanks with a patch of dense silvery pubescence; legs black, coxæ and femora beneath and base of tarsi with pale hair, calcaria white; first abdominal segment with long pale hair; two small oblong spots at base of second segment and two rounded spots between middle and apex, smooth, shining and yellow; a spot on apical middle of segments 3–5, a spot on extreme apical sides of segments 2–4, extreme lateral margin of segment 2, and fringe on apical margin of ventral segments 2–4, all of silvery pubescence; apical segment entirely black.

Chapada. Easily separated from all the species having four smooth yellow or red spots on second abdominal segment, by the broad subquadrate head.

80. **M. graphica** Gerst. (Archiv. f. Naturg., xl, p. 74).— ♀.—Length 15–23 mm.—Head transverse when viewed from above, slightly narrower than thorax; eyes round, convex, polished, removed from posterior margin of head by about half their diameter and nearly their diameter from base of mandibles; thorax elongate, gradually narrowed behind mesothorax; deeply notched on each side before base of metathorax, and slightly so on each side behind prothorax, the intervening space rounded and obtuse; metathoracic spiracles prominent, flanks deeply transversely grooved, smooth and polished before base of metathorax; legs slender; abdomen oblong-ovate, first segment subnodose, the apex depressed, band-like, and with a subapical row of small teeth; the four pale spots on second segment above smooth and polished, those at base narrow and longitudinal, those toward the apex transversely subquadrate or ovate, not large, but broader than those at base; second ventral segment deeply and coarsely punctured, shining.

Velvety black, with scattered suberect black hair; a tuft of whitish pubescence above base of mandibles, otherwise the head is black; two silvery pubescent stripes on meso- and metathorax, more or less interrupted at base of the latter

(leaving an elongate spot on each side of mesothorax), scarcely reaching posterior margin of prothorax; lower margin of flanks densely silvery pubescent; legs with black pubescence, the coxæ and femora with long pale hair, calcaria pale; sides of first abdominal segment, spot on apical middle of segments 2–6, lateral margin of the second, spot on sides at apex of segments 2–4, and apical margin of ventral segments 2 and 3, of silvery pubescence; sixth segment black, except the discal pale spot above; the four smooth, polished spots on upper surface of second segment yellow.

Chapada, Corumbá, Mararu, Paracary, Santarem. Common. Varies considerably in size.

Having sent, some years ago, a specimen of this species to Mr. Gerstaecker, he informed me that it was an unnamed species belonging to the group of *parallela* Klug, and I therefore named it *Gerstaeckeri*, and possibly the specimen, wherever it may be, is still so labelled. Subsequently Mr. Ernest André advised me that it does not differ from *graphica* Gerst.

81. **M. manca** ♀.—Length 10–15 mm.—Same form as *graphica*, but smaller, the pale stripes on the thorax are not interrupted, and extend almost to the anterior margin of the prothorax; the pubescence of the legs, except on coxæ and femora, is black, and the calcaria are black or fuscous; the two smooth yellow spots on posterior part of the second abdominal segment are acutely ovate and *oblique*, while segments 2 and 3 only have a white pubescent spot on extreme sides at apex.

Chapada. Varies much in size.

82. **M. sodalis** ♀.—Length 14–16 mm.—Very much like *graphica;* but the side of the thorax, between the two notches, is prominent and tuberculate, the pale stripes on the thorax extend only a short distance on mesothorax, where they are dilated but not interrupted; the tibiæ and tarsi have more pale pubescence; the calcaria are black or fuscous; the smooth yellow spots at base of second abdominal segment are shorter and broader, being almost short ovate, while the posterior two, although not larger than those at base, are scarcely transverse, but rounded or subquadrate; apical segment fuscous or black.

Chapada. Differs from *manca* by the sides of the thorax, between the two notches, being more prominent and tuberculate; by the shorter pale stripes on the thorax, and by the different shape of the smooth yellow spots on second segment of abdomen above, which are oblique in *manca*. This species, or *manca*, may prove to be *sancta* Gerst.

83. **M. optata** ♀.—Length 13–17 mm.—Shape and ornamentation of thorax much as in *sodalis*, except that the space between the two lateral notches is not so prominent; the thoracic stigmatic tubercles are very prominent; the tarsi are densely pale sericeous, the calcaria pale; the smooth yellow spots on second

abdominal segment above are shaped much as in *manca*, but larger and more deeply yellow, those at base shorter and not so linear; segments 2-4 have a pale pubescent spot on each extreme side at apex.

Chapada, Corumbá, Santarem. This species, or *manca*, or *sodalis*, or *borba*, or *auxiliaris*, may prove to be identical with *parallela* Klug; the description of that species is not sufficiently concise to determine with certainty.

84. **M. borba** ♀.—Length 12-16 mm.—This is also very much like *graphica*, being of same form; but the pale pubescent stripes on the thorax are not interrupted, and reach nearly to anterior margin of prothorax; the tibiæ and tarsi are densely pale pubescent; the smooth yellow spots on second abdominal segment above are shaped much as in *graphica*, although those on the posterior part of the segment are larger and broader.

Chapada. Common. The pale pubescent stripes on the thorax are much as in *manca*, from which this species differs by the pale calcaria, pale pubescence on the legs, and the transverse—not oblique—yellow spots on posterior part of second segment of the abdomen.

85. **M. juvenalis** Gerst. (Archiv. f. Naturg., xl., p. 75).—♀.—Length 12-15 mm.—Same form as *manca*, and very much like that species; but the thorax is not distinctly notched at sides; the two yellow spots on posterior part of second abdominal segment are transverse, not oblique; and the central silvery pubescent stripe on apex of abdomen is formed of spots on apical middle of segments 3-6, while in *manca* it is 2 6.

Chapada. Common.

86. **M. auxiliaris** ♀.—Length 11-14 mm.—Compared with *juvenalis* Gerst., this species has the pale pubescent stripes on thorax shorter, the legs have pale pubescence, the smooth yellow spots on base of second abdominal segment above are shorter ovate, and on this segment there is a small pale pubescent spot on apical middle, wanting in *juvenalis;* otherwise the two species are much alike.

Chapada.

This and the seven preceding species, having the head entirely black above, closely resemble each other in the ornamentation of the abdomen, and may be separated as follows:

Head large, broader than thorax; no pale pubescent spot on apical middle of second abdominal segment.....79. **vivata.**

Head of usual size, not broader than thorax; a small pale pubescent spot on apical middle of second segment, except in *juvenalis*.....2.

2. Pale pubescent stripes on thorax interrupted on mesothorax posteriorly. 80. **graphica.**

Pale pubescent stripes continuous, not interrupted.....3.

3. Calcaria black or fuscous.....4.
   Calcaria pale .....5.
4. Yellow spots on posterior part of second abdominal segment oblique, basal spots long, linear; sides of thorax rounded between the two notches; tibiæ and tarsi outwardly mostly black.....81. **manca.**
   Yellow spots slightly transverse, rounded or subquadrate, basal spots short, ovate; sides of thorax prominent and tuberculate between the two notches; legs with pale pubescence, calcaria black or fuscous.
   82. **sodalis.**
5. Yellow spots on posterior part of second abdominal segment oblique.
   83. **optata.**
   Yellow spots transverse.
   Sides of thorax deeply notched; legs with pale pubescence....84. **borba.**
   Sides of thorax not or scarcely notched.
   Tibiæ and tarsi outwardly mostly with black pubescence: no pale pubescent spot on apical middle of second abdominal segment.
   85. **juvenalis.**
   Legs with pale pubescence; a small pale pubescent spot on apical middle of second segment.....86. **auxiliaris.**

87. **M. unimarginata** ♀.—Length 14-15 mm.—Head transverse, as wide as thorax; eyes very convex, smooth, polished; thorax gradually narrowed posteriorly, lateral margin rather deeply constricted before metathoracic stigmatic tubercles, which are prominent; sides of metathorax coarsely rugose, the posterior face flat and rather abruptly declivous; abdomen ovate, first segment small, slightly widened to apex, which is somewhat constricted transversely, the base with the usual compressed tooth on each side, which appears acute when viewed from above; second segment rather closely and coarsely punctured.

Velvety black, with black pubescence; head entirely black above, cheeks with pale hair; scape of antennæ with golden pubescence; thorax above with two broad entire cupreous pubescent stripes, which are pale at apex of metathorax, flanks with patch of dense silvery pubescence on lower portion; legs with pale glittering hair, calcaria black or fuscous; sides of first segment pale golden; a narrow band, longitudinally grooved on disk, near apex of second segment, and two narrow elongate spots at base yellow, smooth and polished; a silvery stripe on middle of remaining segments beginning at apex of second, and a silvery spot on extreme sides of segments 2-4; venter with long pale hair, dense at apex of segments 2-4.

Chapada. A very distinct species, easily recognized by the narrow yellow band at apex of second segment of abdomen, and the two broad cupreous stripes on thorax.

88 **M. mundula** ♀.—Length 11 mm.—Closely resembles *unimarginata*, but differs by the smaller size, by the two stripes on thorax being narrow and silvery, and the pale calcaria; in two specimens there is a small silvery spot on vertex, and in the other the face is pale golden; the yellow spots at base of second segment are wanting, except in one specimen, where they are very small.

Chapada. Three specimens.

89. **M. Andrei** ♀.—Length 13 mm.—Long and narrow, rugosely sculptured, the head transverse, as broad as thorax, which is long and gradually narrowed behind, not constricted when viewed from above; the eyes very prominent, convex and polished; first segment of abdomen subnodose, only slightly narrowed posteriorly; second ventral segment strongly but not closely punctured.

Velvety black; head entirely black, except some silvery hair on cheeks; two narrow silvery pubescent stripes on thorax above, extending from apex of metathorax to prothorax; lower margin of flanks of thorax broadly silvery; lateral margin of first segment of abdomen, a narrow stripe on middle of the segments beyond the second, extreme sides of segments 2–4, and apical margin of ventral segments 2–4, silvery pubescent; two narrow, strongly arcuated, widely divergent posteriorly, smooth, shining, pale yellow stripes on second segment above; legs with pale glittering pubescence, calcaria white.

Chapada (October). One specimen. Easily recognized by the two arcuated yellow stripes on second segment of abdomen.

It give me much pleasure to dedicate this fine species to Mr. Ernest André, of Gray, France, who has very kindly aided me in the preparation of this paper.

90. **M. rectilineata** André (Ann. Soc. Ent. Fr., lxvii, 1898, p. 48).— ♀.—Length 8.5–11.5 mm.—Head and thorax coarsely rugose, the metathorax coarsely reticulated, except apex and flanks which are shining and almost smooth; thorax broad anteriorly and narrowed behind mesothorax; metathorax abruptly declivous posteriorly; abdomen longitudinally rugose, but less coarsely than thorax; pygidium finely longitudinally aciculate; the second ventral segment strongly punctured.

Black, with coarse black pubescence; head and thorax entirely black; mandibles sometimes red medially; two narrow, slightly bent and divergent, smooth, polished, yellow stripes on second segment of abdomen, nearly reaching apical margin; apical margin of first segment more or less silvery; a silvery stripe on disk of segments 3–5; the extreme sides of these segments also silvery; venter with pale hair; legs entirely black; calcaria black or fuscous.

Chapada. Easily recognized by the two smooth yellow stripes on second segment of abdomen.

91. **M. ipanema** ♀.—Length 9–10 mm.—Closely resembles *rectilineata*, but differs by the narrower and not coarsely sculptured metathorax, which has two narrow silvery pubescent stripes above, and a broad silvery stripe on lower margin of flanks; the first segment of abdomen is silvery at sides above, and the calcaria are white.

Chapada.

MALES.

Eyes ovate, emarginate, subopaque; tegulæ large, elongate oval .....2.
Eyes round or oval, smooth, polished, not emarginate; tegulæ rounded, not elongate.....15.
2. First segment of abdomen broad, scarcely constricted at apex, gradually dilated posteriorly and sessile with base of second segment; prothorax rounded anteriorly; abdomen more or less red.....3.
First segment narrower, depressed, and of uniform width, being quadrate or elongate, with parallel sides; prothorax rectangular in front .....6.
3. Pubescence of second and following segments of abdomen at apex black, more conspicuous from a lateral view; base of clypeus with a more or less prominent nasutiform projection, seen more distinctly from beneath.
1. **macapa** Cress
Pubescence of segments 1–5 or 6 at apex golden or fulvous .....4.
4. Pubescence on tegulæ black; first segment of abdomen except tip, and apical segment, black; clypeus with obtuse nasutiform projection at base; form robust.....2. **escuda** Cress.
Pubescence of tegulæ pale.....5.
5. Base of clypeus with a semicircular roof-like projection; apical segment of abdomen sometimes black or fuscous.....4. **rufiventris** Klug.
Base of clypeus with a spiniform projection at base; two apical segments of abdomen black; form slender.....3. **manga** Cress.
6. Tegulæ with a central longitudinal carina.....7.
Tegulæ without a longitudinal carina.....8.
7. Abdomen black, second segment above silvery at apex.....5. **gracilis** Sm.
Abdomen with segments 2 and 3 red ..... 6. **laguna** Cress.
8. Abdomen black or purple, marked with silvery pubescence .....9.
Abdomen black, apical half of second, and the following segments with dense golden pubescence; metathorax and first segment of abdomen silvery.
13. **onca** Cress.
Abdomen ferruginous, segments 4–7 black; apex of segments 2 and 3 yellowish; head, prothorax, pleura and metathorax densely silvery-ochraceous .....14. **vicosa** Cress.
Abdomen entirely fulvous, clothed with golden pubescence.....14.
9. First segment of abdomen short, scarcely longer than broad.....10.
First segment elongate, twice longer than broad .....13.
10. Last ventral segment more or less pale testaceous .....11.
Last ventral segment entirely black.....10. **jatoba** Cress.
11. Base of second segment of abdomen much flattened, and covered like first segment with short silvery white pubescence; the metathorax with a prominent obtuse tooth on each side....7. **argentula** Dalla Torra.
Base of second segment more or less depressed, but not covered with pale pubescence .....12.
12. Scutellum produced at apex and bilobed; metathorax with a prominent obtuse tooth on each side, and without a subapical discal tooth.
8. **morada** Cress.
Scutellum not produced at apex, simply convex; metathorax with lateral margin serrate and a more or less distinct subapical discal tooth.
9. **croata** Cress.

13. Scutellum flattened, strongly produced and deeply emarginate at tip, the lateral angles prolonged, incurved and subacute; metathorax with a rather long, obtuse, discal spine; pleura, beneath tegulæ, armed on each side with a prominent obtuse tooth; abdomen beyond first segment dark blue and purple; last ventral segment pale testaceous; wings with a beautiful violaceous reflection.....11. **catinga** Cress.

Scutellum elevated, subpyramidal; last ventral segment black.
12. **abadia** Cress.

14. Tegulæ scabrous; metathorax angular laterally but not spinose, and with a small subapical discal tooth .....15. **sincora** Cress.

Tegulæ smooth and shining; metathorax with a prominent lateral tooth; no discal tooth.....16. **pinha** Cress.

15. First segment of abdomen not constricted at apex, gradually dilated posteriorly and conforming in outline with base of second segment...16.

First segment short and very broad, anterior face abruptly declivous, the narrow upper surface transversely depressed, band-like; head large, subquadrate, rather broader than thorax; metathorax and first segment of abdomen above densely silvery; the second segment smooth and polished.....24. **carmo** Cress.

First segment small, narrow, nodiform, more or less constricted at apex...22.

16. Scutellum fulvous.....17. **mystica** Gerst.

Scutellum black.....17.

17. Head very broad and enormously developed, the occiput broadly and deeply emarginate posteriorly, upper angles rounded, lower angles produced into a long obtuse tooth; clypeus deeply transversely excavated.
18. **barboza** Cress.

Head not broader than thorax.....18.

18. Head and prothorax above with black pubescence.....19.

Head and prothorax above with pale pubescence; apex of abdominal segments 1–4 above fimbriate with pale pubescence; small species....21.

19. Abdomen above, behind second segment, not fasciate with pale pubesence..20.

Abdomen above with a band of silvery-ochraceous pubescence, interrupted on middle, on segments 1, 3 and 4.....19. **alagoa** Cress.

20. Metathorax, pleura, first segment of abdomen and basal margin of second, most of venter and legs, rather thickly clothed with white pubescence.
21. **molaca** Cress.

Metathorax with some scattered, long, pale hairs; pleura entirely black; apical margin of first segment of abdomen, broadly interrupted medially, and a spot on each basal corner of second segment, clothed with white pubescence.....20. **anthracina** Gerst.

21. Metathorax above densely covered with a short appressed silvery-white pubescence .....22. **coimbra** Cress.

Metathorax almost nude, reticulated .....23. **inga** Cress.

22. Second segment of abdomen beneath with a pubescent fovea.....23.

Second segment beneath without a fovea .....31.

23. Second segment of abdomen black, more or less ornamented with pale pubescence .....24.

Second segment more or less red.....34. **zapara** Cress.

24. Calcaria black; body above black pubescent; apex of first segment of abdomen and band behind second segment pale ochraceous pubescent.
25. **cniba** Cress.

Calcaria pale ..... 25.

25. Head and prothorax black pubescent ..... 26.

Head and prothorax pale pubescent ..... 29.

26. Tibiæ with black pubescence on outer side, pale on inner ..... 27.

Tibiæ with the pubescence entirely griseous or white ..... 28.

Tibiæ with the pubescence fulvo-fuscous; abdomen with apex of first segment and narrow band behind second, silvery or white.
26. **orbana** Cress.

27. First segment of abdomen at apex with a broad band of silvery-white appressed pubescence; a patch of whitish pubescence on each side of metathorax at base above; tubercle beneath tegulæ large, prominent, obtuse; posterior tibiæ with the pale pubescence on inner side dense and long ..... 27. **vidua** Klug.

First segment with long pale hair, and fringed at apex with rather short pale pubescence, but not forming a broad band; metathorax with scattered long pale hair; tubercle beneath tegulæ acute; posterior tibiæ with the pale pubescence on inner side short and sericeous.
28. **lorena** Cress.

28. Pubescence of head entirely black; ventral segments 2 and 3 fimbriate at apex with white pubescence; wings fuscous, hyaline at base; sides of abdominal segments 1 and 2 at base, and spot at sides of 3, densely white pubescent ..... 30. **cuneta** Cress.

Pubescence of head in front and on clypeus pale; ventral segments 2–4 fimbriate at apex with white pubescence; wings uniformly fuscous; first abdominal segment with long, loose, pale hair; sides of second segment at base, and spot at extreme sides of 3 and 4 pale pubescent.
29. **caxara** Cress.

29. Anterior wing with marginal cell smaller and not longer than second submarginal; tubercle beneath tegulæ large, prominent and subacute.
31. **almada** Cress.

Anterior wing with marginal cell about as long as the first and second submarginals combined ..... 30.

30. Second submarginal cell twice longer than high, pointed at base; pleura obtusely protuberant beneath tegulæ ..... 32. **picada** Cress.

Second submarginal cell scarcely longer than high, subquadrate, not pointed at base; pleura not protuberant beneath tegulæ ..... 33. **barra** Cress.

31. Second segment of abdomen above black, with two large smooth pale yellow spots; calcaria black ..... 35. **colorata** Gerst.

Second segment above black, more or less ornamented with white pubescence ..... 32.

32. Pleura with a more or less developed tubercle or spine beneath tegulæ ..... 33.

Pleura without tubercle or spine beneath tegulæ ..... 36.

33. Abdomen when viewed from above entirely black behind base of second segment ..... 34.

Abdomen more or less banded with pale pubescence behind second segment 35

34. Tubercle beneath tegulæ obtuse; ventral segments 2 and 3 fringed at apex with pale pubescence ..... 36. **tapera** Cress.
Tubercle acute; venter black pubescent..... 37. **serra** Cress.
35. Tubercle beneath tegulæ short, obtuse; pro- and mesothorax entirely black pubescent ..... 38 **viana** Cress.
Tubercle long, acute; metathorax silvery tomentose.... 41. **maraca** Cress.
36. Head protuberant behind ocelli; abdomen polished, first segment long, petiolate ..... 43. **pomba** Cress.
Head not protuberant behind ocelli..... 37.
37. Four posterior legs with black pubescence..... 40. **taboca** Cress.
Legs with griseous pubescence..... 38.
38. Abdomen, when viewed from above, entirely black behind base of second segment ..... 39. **sabara** Cress.
Abdomen with a broad silvery pubescent band behind second segment. 42. **acara** Cress.

The following four species have the abdomen smooth, shining, feebly punctured and ferruginous, the first segment broad and dilated at apex and sessile with the base of second segment; eyes ovate, emarginate, facetted; clypeus with a more or less well defined nasutiform or roof-like process at base; prothorax rounded in front, anterior angles not prominent; mesothorax deeply punctured and longitudinally grooved; scutellum convex, with a more or less distinct shining tubercle or ridge on disk; metathorax rounded above and at sides, reticulated, the basal middle with a more or less well defined longitudinal area; tegulæ ovate, not unusually large and elongate, as in the next group; anterior wings with a large marginal cell, broadly truncate at apex, and not extending beyond tip of third submarginal, which is complete and distinct.

Pubescence of abdomen above black, mixed with pale..... Species 1.
Pubescence of abdomen above mostly golden ..... Species 2-4.

1. **M. macapa** ♂.—Length 10–11 mm.—Black, shining, abdomen ferruginous, apex of segment 5, and 6 and 7 entirely black, the first segment rarely black; the pubescence pale, more dense and pale ochraceous on face, cheeks, prothorax above, pleura, and base of metathorax. Head finely punctured, vertex with some black hair; eyes ovate, emarginate; tip of flagellum red; clypeus transversely excavated, with a subtriangular nasutiform process at base, concave and polished beneath. Prothorax rounded on sides anteriorly, with upper margin pale ochraceous tomentose; mesothorax with short black pubescence and distinct close punctures, a longitudinal groove on each side of disk and a smooth longitudinal subcarinate line on each side over tegulæ, these last ending posteriorly in a transverse carinated tubercle; scutellum black pubescent at base, and at apex with long pale hair, convex, punctured, with a small smooth line or

tubercle on disk, and a deep transverse fovea at base; metathorax with pale silky hair, rounded above and at sides, reticulated, with two long longitudinal carinæ from base nearly to middle, forming an elongate narrow area, from which diverge on each side an oblique carina to apex, on each side of this area at extreme base a transverse patch of pale ochraceous pubescence; tegulæ smooth, polished, piceous, paler on depressed outer margin, sometimes fusco-testaceous, with margin pale testaceous. Wings subhyaline, pale fuscous on apical half and hyaline at base; marginal cell large, broad, sublanceolate, truncate at tip; first and second submarginal cells elongate and about equal in length and size; second submarginal pointed at base, receiving the recurrent nervure at about the middle, the first and second transverso-cubital nervures widely separated on marginal; third submarginal complete, irregularly subquadrate, slightly narrowed above. Legs with pale glittering pubescence, sparse on femora; tarsi pale golden pubescent; calcaria white. Abdomen ferruginous, shining, irregularly punctured, with pale scattered pubescence at base and sides, and over second segment; the three or four apical segments more or less black; first segment rarely black, depressed, dilated at apex which is feebly constricted, and conforming in outline with base of second segment, the latter smooth, polished and impunctured on disk; apical middle of second and remaining segments clothed with black pubescence, more obvious when viewed laterally.

Chapada. This may be *lucidiventris* Gerst., which is said to be the ♂ of *phalerata* Klug.

2. **M. escada** ♂.—Length 14 mm.—Form robust, black, with segments 2–6 of abdomen ferruginous, the pubescence pale, and dense yellowish on head, prothorax, pleura and base of metathorax, some black hairs on vertex. Eyes emarginate; clypeus with an obtuse nasutiform process at base. Prothorax rounded anteriorly; mesothorax confluently punctured, sculptured much as in *macapa*, the pubescence black; scutellum convex, a smooth polished tubercle on disk and a deep fovea at base, the pubescence black at base, long and white at apex; metathorax rounded above, reticulated, sparsely clothed with long pale silky hair, more dense laterally, above pale tomentose, a dense transverse patch of pale ochraceous pubescence at extreme base, the long narrow area at base as in *macapa;* tegulæ black, with black pubescence. Wings fusco-hyaline, darker at apex, pale at base; neuration as in *macapa*. Legs with pale glittering pubescence; calcaria pale. Abdomen ferruginous, shining, feebly punctured; first segment shaped as in *macapa*, and, except apical margin, black with scattered pale hair; terminal segment black, with black pubescence; apical margin of segments 2–6 with golden-fulvous pubescence, more distinct when viewed laterally; venter with pale pubescence, the second segment deeply and sparsely punctured.

Rio de Janeiro (November). One specimen. A very robust form, and may be identical with *terminalis* Gerst.

3. **M. manga** ♂.—Length 8.5 mm.—Slender, black, the abdomen except two apical segments ferruginous; head prothorax and pleura thickly clothed with pale ochraceous pubescence. Clypeus with a small acute nasutiform tooth at base; eyes emarginate. Prothorax round anteriorly; mesothorax distinctly punctured, sculptured much as in *macapa*, the pubescence black; scutellum and

metathorax as in *escada*; tegulæ fuscous, the pubescence pale. Wings subhaline, darker at apex, neuration as in *macapa*. Legs with the pubescence and calcaria pale. Abdomen formed much as in *macapa*, the punctures scattered and especially sparse on second segment which is polished; the pubescence on segments 1 and 2 scattered and white, that on apex of second and the three following segments golden, more obvious when viewed laterally; the two apical segments black, with black pubescence; venter with sparse pale pubescence.

Chapada (April). Two specimens. This is smaller and more slender than the other species of this group, and with the clypeal tooth narrower and more acute.

4. **M. rufiventris** Klug (Nova Acta. Cæs. Nat. Cur., x, p. 306, pl. xxi, fig. 12). ♂.—Length 11–12 mm.—Very much like *macapa*, but easily distinguished by the basal process of the clypeus being transverse, broadly rounded and roof-like, and by the pubescence on apical margin of the second and following segments of abdomen being golden; the reticulations of metathorax are larger and the basal area more or less irregularly shaped, and the tegulæ have pale pubescence; the terminal segment of the abdomen is sometimes more or less black or fuscous.

Corumbá, Santarem; lowlands (March).

The following twelve species have the abdomen subpetiolate, the first segment narrow, depressed, usually quadrate, or elongate (*catinga*, *abadia*), sides generally parallel, occasionally subnodose (*sincora*, *pinha*), rarely transverse at apex (*vicosa*); second segment sometimes much flattened above at base (*argentula*); segments 4–7 *with a central longitudinal carina in all the species;* clypeus longitudinally carinated at base, the carinæ sometimes ending in two teeth towards apex; eyes ovate, deeply emarginate, facetted; prothorax rectangular in front, anterior angles more or less prominent and acute; mesothorax generally roughly sculptured and longitudinally costate; scutellum generally convex, sometimes flattened, shield-like and toothed at apex (*catinga*); the metathorax always densely pubescent, depressed, with more or less angulate or toothed sides and often with a distinct subapical discal tooth; tegulæ unusually large and elongate-ovate, rarely with a longitudinal carina (*gracilis*, *laguna*), or tuberculate at base (*catinga*); wings with large, lanceolate or sublanceolate marginal cell; generally small, narrow, oblique first marginal cell; large, elongate second submarginal cell, and very large, irregularly shaped third submarginal, the outer nervure of which is generally more or less indistinct, and extending far beyond the apex of marginal cell.

Tegulæ with a median longitudinal carina.
Second abdominal segment black.....Species 5.
Second abdominal segment ferruginous.....Species 6.
Tegulæ without longitudinal carina.
Second abdominal segment black.
Abdomen with the pale pubescence silvery white.
First segment quadrate, or only slightly longer than wide...Species 7–10.
First segment elongate, much longer than wide.....Species 11–12.
Abdomen with the pale pubescence mostly fulvous.....Species 13.
Second abdominal segment fulvous or ferruginous.....Species 14–16.

5. **M. gracilis** Smith (Brit. Mus. Catal. Hym., iii, p. 42).—♂.—Length 8–10 mm.—Black, opaque; head, prothorax, pleura beneath wings, metathorax and apical margin of segments 1 and 2 of abdomen, densely silvery-white pubescent. Eyes emarginate. Anterior margin of prothorax straight, transverse, with acute lateral angles; mesothorax coarsely, confluently sculptured, with several smooth longitudinal carinæ, the pubescence short and black; scutellum convex, with erect black pubescence, becoming longer and pale at apex; metathorax flattened, the lateral angles obtuse, and when viewed from beneath carinate; tegulæ large, elongate ovate, opaque fuscous, the pubescence black, a well-defined longitudinal carina on middle the entire length. Wings subhyaline, darker at apex; marginal cell lanceolate, the apex subtruncate; first submarginal cell small as compared with the other cells, oblique; second submarginal large, as long as marginal, receiving the recurrent nervure beyond the middle, the first and second transverso-cubital nervures widely separated on marginal; third submarginal complete, irregularly subquadrate, narrowed beneath and extending far beyond apex of marginal cell, with the outer nervure somewhat indistinct. Legs robust, the pubescence and calcaria white. Abdomen incurved at apex, densely, strongly and distinctly punctured, clothed with a scattered long white pubescence, more dense at sides and on apical margin of the segments; first segment short, quadrate, depressed; second segment flattened on basal middle, the pubescence above short and black, the white pubescent band at apex more or less indented on anterior margin; third and following segments with median longitudinal carina; venter with pale glittering pubescence.

Chapada; Santarem; Pedra Branca.

6. **M. laguna** ♂.—Length 9 mm.—Form much as in *gracilis*, but more robust; black, the second and third segments of abdomen orange-ferruginous or ferruginous. Head with pale pubescence, golden on front and mixed with black on vertex; eyes emarginate; tips of mandibles ferruginous. Prothorax, mesothorax, pleura and metathorax much as in *gracilis*; scutellum coarsely reticulate, flat above, quadrate, slightly narrowed behind, sides and apex margined, the latter broadly subemarginate, with acute lateral angles; tegulæ, wings and legs as in *gracilis*, except that the former is shining and testaceous at apex. First abdominal segment transverse, shorter and broader than in *gracilis*, black, with the apical margin narrowly white pubescent; second segment punctured as in *gracilis*, shining, with pale pubescence, more dense at sides and narrowly white pubescent at apex; disk of segment 3–7 longitudinally carinate, the pubescence pale.

Chapada (April). Two specimens. This species and *gracilis* are easily separated, from the following species of this group, by the carinate tegulæ.

7. **M. argentula** Dalla Torra (Catal. Hym., viii, p. 11; *argentata* || Klug, Nova Acta Cæs. Nat. Cur., x, p. 305, pl. xxi, fig. 11).—♂.—Length 10.5 mm.—Black, opaque. Head silvery tomentose, vertex black, with black pubescence; clypeus with two minute teeth toward base; eyes emarginate. Pro- and mesothorax as in *gracilis*, the former silvery tomentose; scutellum coarsely punctured, convex, protuberant, the pubescence black, pale at apex; metathorax and pleura densely silvery-white tomentose, the former flattened, depressed on each side of the subcarinate disk, lateral margin straight, subcarinate and terminating posteriorly in a prominent subacute tooth pointed backward, the punctuation fine, as seen through the silvery tomentose; tegulæ shining fuscous, not carinate, the pubescence black. Wings much as in *gracilis*. Legs slender, with pale glittering pubescence; calcaria white. First abdominal segment narrow, depressed, quadrate, densely silvery tomentose; second segment broadly flattened at base above, densely, distinctly punctured, the pubescence short and black, a broad band at base and a narrow one at apex, attenuated on disk, silvery tomentose, apex of the segment smooth and shining; remaining segments longitudinally carinate on middle and sparsely clothed with pale glittering pubescence; beneath, the second segment is more or less silvery tomentose, the apical segment with a large quadrate testaceous spot.

Santarem. The second segment of the abdomen is more flattened above at base than in *gracilis*, and has a broad white tomentose band, wanting in that species.

8. **M. morada** ♂.—Length 9 mm.—Very much like *argentula*, and differs mostly as follows:—the scutellum is produced and bilobed at apex; the metathorax less flattened, and roughly sculptured as seen through the silvery tomentose, the disk not carinate or toothed at apex, the lateral posterior angles have a short subacute tooth directed outwardly; the second abdominal segment is only slightly depressed at base and without the broad silvery tomentose band.

Santarem. One specimen.

9. **M. croata** ♂.—Length 6-8 mm.—Differs from *morada* only as follows: scutellum convex, not bilobed at apex; metathorax with the lateral margin serrate and an apical porrect discal tooth; base of second abdominal segment subconvex, or very feebly depressed.

Chapada; Corumbá; Santarem.

10. **M. jatoba** ♂.—Length 11 mm.—Very much like *morada*, and differs by the scutellum being prominent and convex, not bilobed at apex; the lateral posterior angles of metathorax more obtuse; the second abdominal segment less deeply punctured, and the last ventral segment entirely black.

Santarem. One specimen. Larger than *croata*, with more convex scutellum, and more angulate sides of metathorax.

11. **M. catinga** ♂.—Length 12 mm.—Black, sparsely pubescent. Head and thorax roughly sculptured with large discoidal punctures; clypeus smooth and flat on apical middle, with two longitudinal carinæ arising close together at extreme base, slightly diverging to about the middle, and then obliquely directed towards base of mandibles, and when viewed from beneath the clypeus appears rather deeply emarginate and with two small teeth at the point of discal divergence; eyes emarginate; front between antennæ and clypeus thickly clothed with silvery-white pubescence. Lateral anterior angles of prothorax acutely carinate, the posterior margin prominent; mesothorax longitudinally carinate; scutellum flattened, strongly produced, shield-shaped, with carinate sides, the apex deeply emarginate, the lateral angles being prolonged, incurved and subacute, the disk carinate on apical middle; metathorax densely silvery tomentose, the lateral margin serrate, the apical middle with a prominent, rather long, subporrect, obtuse tooth or spine; a strong, subcompressed, obtuse tooth on pleura beneath tegulæ, the latter minutely alutaceous, with a shining subcarinate tubercle at base. Wings subhyaline, with a strong violaceous reflection, fuscous on apical and costal margins, nearly clear at base and in the third submarginal and second discoidal cells; neuration much as in the proceding species. Legs slender, the pubescence sparse and pale; calcaria white. Abdomen slender, subpetiolate; first segment twice longer than wide, of equal width, blue at base and densely silvery-white tomentose, with long, sparse white hair; second and following segments purple, polished, with scattered pale hair laterally, sparsely punctured, the punctures few and scattered on basal middle of second segment; segments 3-7 with a longitudinal central carina; venter black with scattered pale pubescence, second segment blue, deeply, sparsely punctured, the apical segment pale testaceous.

Santarem. Two specimens. A very distinct species, easily recognized by the shield shaped scutellum, strongly toothed at apex, and by the purple abdomen.

12. **M. abadia** ♂.—Length 9-12 mm.—Form much as in *catinga*, but more thickly pubescent; the head, prothorax and pleura much less coarsely punctured; clypeus without the triangular open space at apex, the two longitudinal carinæ on basal middle longer and ending in two acute teeth near anterior margin; mesothorax irregularly costate; scutellum conical, prominent; the central apical tooth on metathorax more obtuse and compressed; pleura protuberant, with a median obtuse tubercle; tegulæ more or less pinched at base; wings paler, the third submarginal cell larger and broader beneath, receiving the recurrent nervure at about the middle, while in *catinga* it is received between the middle and tip; legs more thickly pubescent; abdomen black, the first segment slightly wider at apex, the second segment shining, strongly punctured, flattened and almost smooth on basal half above, the apical margin fimbriate with white pubescence, and the sides of remaining segments more thickly pubescent; beneath entirely black with pale pubescence; no testaceous spot on apical segment; otherwise as in *catinga*.

Santarem.

13. **M. onca** ♂.—Length 8 mm.—Black; head and thorax deeply punctured. Head with pale golden pubescence, whitish on clypeus, eyes emarginate.

Mesothorax and scutellum at base with black pubescence, that on prothorax and pleura pale sericeous; anterior angles of prothorax acute; mesothorax longitudinally costate, the scutellum convex, with long pale hair at tip; metathorax unarmed, depressed, with dense appressed silvery-white pubescence, the sides angulate; tegulæ large, elongate. Wings pale fuscous, subhyaline at base; marginal cell long, narrow, lanceolate, broadly rounded or subtruncate at apex; first submarginal cell small, narrow, oblique, the second submarginal large, broad, longer and larger than marginal, extending as far out as to apex of the latter, and receiving the recurrent nervure beyond the middle; first and second transverso-cubital nervures widely separated on marginal; third submarginal large, complete, but indistinctly defined, receiving the recurrent nervure slightly beyond the middle. Legs with pale pubescence, sparse on femora; calcaria white. Abdomen narrow, incurved at apex; first segment narrow, subquadrate, depressed, clothed, like the metathorax, with dense silvery-white pubescence; second segment strongly and rather closely punctured, the pubescence on base and sides sparse and white, that on apical half indented anteriorly, and on remaining segments dense golden-fulvous; venter with pale pubescence, the second segment strongly punctured, the apical segment more or less pale testaceous.

Chapada. One specimen. Resembles somewhat the description given of *inaurata* Smith, but in that species the metathorax is said to have a prominent discal tubercle.

14. **M. vicosa** ♂.—Length 8 mm.—Black; head, prothorax, pleura and metathorax clothed with a more or less dense pale ochraceous pubescence, paler and silvery on metathorax and pleura; eyes emarginate. Anterior angles of prothorax prominent, acute; mesothorax and scutellum coarsely sculptured, the pubescence black, long and mixed with pale on scutellum, which is convex; tegulæ large, elongate, dark fuscous, broadly margined outwardly with pale testaceous. Wings yellowish subhyaline, darker on apical margin; marginal cell large, broad, sublanceolate, broadly truncate at apex; second submarginal nearly as large as the marginal, the apex extending nearly as far as to apex of marginal, receiving the recurrent nervure beyond the middle, the first and second transverso-cubital nervures widely separated on marginal; third submarginal cell large, complete, with the outer nervure very faint, broader below than above, receiving the recurrent nervure between middle and tip. Legs slender, the pubescence and calcaria pale. Abdomen deeply and evenly punctured, especially on second segment, the pubescence pale, dense and silvery on apical margin of basal segment, which is broad, transversely subquadrate, depressed; segments 1–3 fulvo-ferruginous, the pubescence on apex of second segment golden, white on lateral apical margin, the fourth and following segments black, with pale pubescence and together with the third having a longitudinal central carina.

Chapada (April). One specimen. This species appears to resemble both *simplex* Smith and *squamata* Smith, but the descriptions given are not sufficiently full to determine in either case.

15. **M. sincora** ♂.—Length 11.5 mm.—Head and thorax black, abdomen and legs fulvo-ferruginous; head, pleura and metathorax above deusely golden-

fulvous tomentose; eyes emarginate; palpi, mandibles, and three basal joints of antennæ pale ferruginous. Prothorax with dark golden pubescence, the anterior angles acute; mesothorax coarsely reticulated, longitudinally costate and clothed, as well as scutellum and tegulæ, with black pubescence; scutellum convex, with erect fuscous pubescence; metathorax with angulate sides and a small subapical discal tooth; tegulæ large, elongate, finely scabrous, black, with very short black pubescence. Wings fusco-hyaline, paler at base, then euration much as in *onca* except that the marginal cell is longer and narrower, and the second submarginal larger and not extending as far out as tip of marginal. Legs, including coxæ, pale ferruginous, the pubesence pale golden; calcaria short, pale, tipped with black. Abdomen strongly punctured, incurved at apex; first segment except base, broad band at apex of second and remaining segments golden tomentose; first segment short, narrow, subnodose at apex, the second flattened above except apex; segments 4–6 with a central longitudinal carina; venter deeply, strongly punctured, first segment obtusely toothed beneath.

Rio de Janeiro (November). One specimen.

16. **M. pinha** ♂.—Length 8 mm.—Very much like *sincora*, but smaller, with the golden pubescence less dense and conspicuous; tegulæ smooth, shining, nigro-fuscous, paler at apex; sides of metathorax above more strongly angulate and produced into an obtuse tooth; calcaria very long, slender, not tipped with black; the golden pubescent bands on abdomen less distinctly defined.

Rio de Janeiro (November). One specimen.

The following eight species have the first segment of the abdomen broad and dilated at the apex, depressed, and not at all nodose, but sessile with base of second segment, and conforming in outline therewith, except in *carmo* where the upper surface is very short, band-like, the anterior face being abruptly declivous to base of the segment; head sometimes enormously developed, as in *barboza;* eyes generally round or subovate, and more or less convex, not emarginate; anterior angles of prothorax more or less rounded and obtuse; metathorax rounded laterally and above, unarmed; tegulæ rounded, not elongate, much smaller than in the preceding group:

Scutellum fulvo-ferruginous ..... Species 17.
Scutellum black.
  First segment of abdomen depressed, gradually dilated to apex.
    Head enormously developed, cheeks spined ..... Species 18.
    Head not or very slightly broader than thorax, cheeks not spined.
      Large species ..... Species 19–21.
      Small species ..... Species 22–23.
  First segment of abdomen very short and transverse at apex, like a band or collar ..... Species 24.

17. **M. mystica** Gerst. (Archiv. f. Naturg., xl, p. 48).— ♂.—Length 15 mm. —Velvety black. Head large, broader than thorax, transversely quadrate, densely and finely punctured, the pubescence black and erect, except on clypeus where it is pale; a large, strong, subacute tooth on cheeks beneath posteriorly; clypeus with two long teeth on apical middle; eyes small, ovate, depressed, minutely facetted; scape of antennæ fringed with long pale pubescence. Pro- and mesothorax closely punctured, clothed with black pubescence; tegulæ piceous, shining; scutellum convex, deeply punctured, orange-ferruginous; pleura and metathorax densely pale silvery ochraceous tomentose, with longer whitish hair. Wings fuscous, the base and a large spot beneath stigma, hyaline; marginal cell short, broadly rounded at tip, not extending beyond the very short, subquadrate second submarginal, which is often more or less incomplete; third submarginal cell not enclosed Legs thickly fringed with long pale hair; calcaria black. Abdomen short ovate; first segment depressed, not nodose or constricted at apex, gradually dilated posteriorly and sessile with base of second segment, the pubescence pale-ochraceous, more dense and appressed on apical margin; second segment densely and finely punctured, the pubescence black, except on sides at base where it is pale silvery-ochraceous and appressed; remaining segments with black pubescence, longer, sparse and whitish on extreme sides; venter polished, the pubescence sparse and pale except at apex; second segment sparsely punctured.

Rio de Janeiro (November). Easily recognised by the orange-ferruginous scutellum, and silvery tomentose metathorax and base of abdomen.

18. **M. barboza** ♂.—Length 15 mm.—Black, opaque. Head larger than the entire thorax, very broad (6 mm.), transversely subquadrate, finely punctured, with sparse pale pubescence, more dense on the front and on anterior margin of clypeus; occiput deeply broadly emarginate posteriorly, the lateral angles produced, broadly rounded, compressed and carinate, the cheeks beneath with a long stout tooth directed backward; clypeus very transverse, narrow, and deeply depressed; mandibles long, narrow, bidentrate at tip; eyes small, ovate, flattened; ocelli minute. Thorax much narrower than the head, deeply punctured, the pubescence short and pale, that on pleura and metathorax dense and ochraceous, brown at base of the latter, and at sides and apex long and pale; metathorax closely punctured and rounded behind; the tegulæ castaneous, rounded, polished; scutellum convex. Wings fuscous, with a pale spot at tip of second submarginal cell, neuration much as in *alagoa*, except that the marginal cell is longer, narrower and gradually rounded to apex. Legs slender, clothed with pale pubescence; calcaria white. Abdomen short, ovate, very finely and closely punctured, shining, clothed with pale sericeous appressed pubescence, except on apical middle of second segment where it is black and very short; first segment depressed, broad and subconstricted at apex, sessile with base of second segment and conforming in outline therewith; venter polished, with sparse, appressed, pale pubescence, more dense on apical margin of the segments; second segment sparsely punctured, the basal segment with a short prominent carina on disk.

Chapada (February). One specimen. Easily recognized by the

enormously developed head. The pubescence on the abdomen is pale sericeous and more dense on apex of first, basal sides of second and on third and following segments.

19. **M. alagoa** ♂.—Length 15 mm.—Large, velvety-black, clothed with black pubescence; head and thorax densely, confluently punctured. Head transverse, not wider than thorax; eyes round, very convex, polished; clypeus and mandibles fringed with white pubescence, the former with three minute teeth on apical middle. Anterior angles of prothorax rounded; scutellum convex, with a prominent, shining tubercle on disk; pleura with an obtuse tubercle beneath tegulæ; metathorax coarsely reticulated, abruptly declivous behind, clothed with long pale hair; tegulæ rounded, smooth and polished. Wings violaceous fuscous, the extreme base, a line across first submarginal cell, a furcate streak through second and third submarginals and a spot beneath tip of second submarginal, hyaline; marginal cell long, broad, and broadly truncate at apex; second submarginal almost as long the marginal, narrowed and pointed at base, receiving the recurrent nervure in the middle; third submarginal sometimes indistinctly defined, narrowed beneath, also receiving the recurrent nervure in the middle. Legs fringed with long pale pubescence, that on outer side of tibiæ short and black; calcaria white. Abdomen clothed with short black pubescence, very sparse on second segment above, which is finely punctured and shining; first segment very broad at apex, obliquely declivous at base, the upper surface very short and transverse, sessile with base of second segment, and clothed with dense appressed white pubescence, broadly interrupted on disk; base of second segment on each side with white pubescence, also a white pubescent line at extreme side; a band of dense appressed white pubescence on segments 3 and 4 above, interrupted medially; the venter polished, with sparse white pubescence on apical margin of segments 2 and 3; second segment sparsely punctured, gibbous towards base.

Chapada (January, October). One specimen. A large, black species, with a white pubescent band, interrupted medially, on third and fourth segments of abdomen above.

20. **M. anthracina** Gerst. (Archiv. f. Naturg., xl, p. 311).—♂.—Length 14 mm.—Velvety black, the pubescence black. Head narrower than thorax; clypeus and cheeks with pale pubescence, the former with three small teeth on apical middle; eyes round, convex, polished. Prothorax rounded anteriorly; mesothorax densely and coarsely punctured; scutellum convex, with a polished tubercle on disk, the apex with long, pale, silky hair; a blunt tubercle on pleura beneath tegulæ; metathorax reticulated, sloping above and abruptly declivous and flat posteriorly, clothed with long pale silky hair, and two silvery-white tomentose spots above near base; tegulæ round, smooth, polished, with black pubescence. Wings and legs as in *alagoa*. Abdomen shaped and ornamented as in *alagoa*, except that the pubescence above beyond base of second segment is entirely black, except a few white hairs on extreme sides; venter shining, with sparse white pubescence, fringed on apical margin of segments 2 and 3, that on apical segments black; second segment sparsely punctured, gibbous at base, extreme lateral margin with white pubescent line.

Chapada (September). Two specimens.

21. **M. molaca** ♂.—Length 16–18 mm.—Velvety black. Head transverse, narrower than thorax, with pro- and mesothorax and scutellum clothed with a dense, erect black pubescence; eyes rounded, convex, polished; clypeus with three teeth on apical middle; mandibles fringed with pale pubescence. Prothorax with rounded anterior angles; scutellum convex; an obtuse tubercle beneath tegulæ; pleura and metathorax with pale ochraceous sericeous pubescence, the latter reticulated, short and transverse above and obliquely declivous behind, with rounded sides, the pubescence long and loose; tegulæ round, punctured, the pubescence black. Wings much as in *alagoa*. Legs with pale glittering pubescence; calcaria white. Abdomen shaped as in *mystica*, with the first segment depressed, much more broadly dilated at apex, not constricted, sessile with base of second segment and conforming in outline therewith, clothed with pale ochraceous sericeous pubescence, more dense on apical margin; second segment sparsely punctured, polished at base, a smooth impunctured line on disk, the apex finely and closely punctured, on the base and sides the pubescence is pale and on remainder of the abdomen above it is black and velvety; venter with pale pubescence, except on the two apical segments, where it is black; second segment polished, with large and small sparse punctures, the basal middle pinched into a prominent carina or keel.

Rio de Janeiro (November). Two specimens.

22. **M. coimbra** ♂.—Length 7.5 mm.—Small, black. Head transverse, as wide as thorax, thickly clothed with erect pale glittering pubescence, and when viewed in front the arrangement of the pubescence around the ocelli give somewhat the appearance of a dog's face; the eyes rather large, convex and shining. Thorax closely punctured, the pubescence black, pale and erect on prothorax and apex of scutellum; anterior angles of prothorax rounded; pleura beneath tegulæ with a patch of dense white pubescence; scutellum flattened; metathorax above clothed with a short appressed silvery-white pubescence, a broad silvery-white band at base above. Wings fusco-hyaline, clear at base; marginal cell broad, sublanceolate, truncate at apex, not extending beyond tip of third submarginal, which is subtriangular and somewhat indistinctly defined; second submarginal pointed at base, the first and second transverso-cubital nervures widely separated on marginal. Legs pale fuscous, with pale pubescence; calcaria white. Abdomen with basal segment very broad at apex, which is sessile with base of second segment and conforming in outline therewith, clothed with fine pale hair, the apical margin, and also of segments 2–4, densly fringed with silvery-white pubescence; second segment shining, finely punctured, the pubescence pale and dense on apical margin of the segments; second segment sparsely punctured, gibbous at base, apical segment fuscous.

Corumbá (March). One specimen.

23. **M. inga** ♂.—Length 7–7.5 mm.—Small, black, clothed with pale glittering pubescence, more dense on head, prothorax, pleura, scutellum, base of metathorax and apical margin of abdominal segments 1–4. Eyes large, round, convex; mandibles pale fuscous; mesothorax with black pubescence; metathorax sparsely pubescent, reticulated, rounded above and laterally; the scutellum depressed. Wings subhyaline, fuscous on apical third; marginal cell sublanceolate, broadly

rounded at apex; second submarginal little more than half the length of the marginal, pointed at base, receiving the recurrent nervure in the middle; third submarginal indistinctly defined, subtriangular, narrowed nearly to a point beneath. Abdomen shining, the pubescence pale; first segment broadly dilated at apex and sessile with base of second segment, conforming in outline therewith, apical margin fringed with pale sericeous pubescence; second segment polished, sparsely punctured, sericeous with pale pubescence; apical margin of segments 2–4 fringed with pale sericeous pubescence, that on apical segments black or fuscous; venter shining, the pubescence pale; second segment deeply and rather closely punctured, the base not gibbous; apical margin of segments 2–4 fringed with pale pubescence.

Chapada (February). Two specimens.

24. **M. carmo** ♂.—Length 12 mm.—Robust, black; head and thorax closely and finely punctured; head above, pro- and mesothorax and scutellum with short black pubescence; clypeus, mandibles and cheeks silvery tomentose. Head large, subquadrate, slightly broader than thorax, extended behind the eyes fully their diameter, with rounded posterior angles; clypeus nasutiform, obtuse, deeply notched in middle; mandibles broad, robust, produced and carinate at base beneath; eyes rather small, round, convex, polished; scutellum convex, punctured, with a small smooth spot on disk; pleura silvery sericeous tomentose; anterior angles of prothorax obtusely rounded; metathorax short, broad and transverse above, abruptly declivous behind, the upper surface densely silvery-white tomentose; tegulæ small, round, polished, nigro-fuscous. Wings fuscous, marginal cell broad, sublanceolate, the apex broadly truncate; first and second submarginal cells about equal in length, the latter pointed at base; third submarginal incomplete. Legs with pale pubescence; calcaria white. Abdomen shining, feebly punctured; first segment very short and broad above, like a narrow band or collar, densely silvery-white tomentose, sessile with base of second segment, but not conforming in outline therewith, anterior face flat and abruptly declivous; second segment polished and impunctured, very feebly punctured at apex; sides of segments 2–5 with pale sericeous pubescence, apical margin of segments 2–4 and apex with black pubescence; venter shining, the pubescence pale, silvery tomentose on apex of second segment; apical margin of segments 2–4 fimbriate with white pubescence; base of second segment gibbous and polished.

Santarem. One specimen. Easily recognized by the robust, subparallel form, the very short, broad, transverse basal segment of the abdomen, which is nearly as broad as base of second segment, which latter is smooth and polished above.

The following nineteen species have the abdomen petiolate or subpetiolate, the first segment long, more or less nodose and constricted at apex; head not wider than the thorax; eyes round or short ovate, prominently convex; scutellum generally convex, with a more or less prominent tooth on each side at base, often hidden by the pu-

bescence; the metathorax reticulated, depressed, the lateral margin more or less angular and sharp, unarmed; pleura generally with a tubercle beneath tegulæ, the latter small and rounded; the second ventral segment with or without a discal fovea.

Second ventral segment foveate.
  Second abdominal segment black.
    Calcaria black ....Species 25.
    Calcaria pale.
      Pubescence of head and thorax mostly black .....Species 26–30.
      Pubescence of head and thorax mostly pale.....Species 31–33.
  Second abdominal segment ferruginous.....Species 34.
Second ventral segment not foveate.
  Second segment above with two large yellow spots; calcaria black....Species 35.
  Second segment without yellow spots; calcaria pale.
    Pubescence of head and thorax mostly black.....Species 36–40.
    Pubescence of head and thorax mostly pale.....Species 41–43.

25. **M. cuiba** ♂.—Length 12.5 mm.—Black, opaque, the pubescence black; a band at apex of first abdominal segment, and another behind second segment covering apical margin of second and all of the third, pale ochraceous pubescent; metathorax coarsely reticulated, the pubescence black; scutellum convex, with long black pubescence, lateral teeth very short; a small obtuse tubercle beneath tegulæ. Wings violaceous fuscous; marginal cell short, not longer than second submarginal, truncate at apex; first and second transverso-cubital nervures approximate on marginal; second submarginal receiving recurrent nervure between middle and base; third submarginal more or less incomplete, very much narrowed below. Legs black, with black pubescence; calcaria also black. Abdomen with basal segment narrow, nodose and broadly subconstricted at apex; second segment minutely alutaceous; beneath shining, the first segment carinate and toothed near apex; second segment deeply and sparsely punctured, with an elongate black pubescent fovea on disk; apical margin of segments 2 and 3 more or less fringed with pale pubescence, sometimes only laterally.

Chapada (April). Two specimens. A very distinct species, the pubescence being entirely black, excepting the two ochraceous bands on abdomen, one on the first, the other behind the second segment.

26. **M. orbana** ♂.—Length 12.5 mm.—Black, the pubescence black, having a reddish appearance in certain lights. Clypeus with a few pale hairs; eyes round, convex, polished. Metathorax reticulated, clothed with long pale hair, reddish at base; no tubercle beneath tegulæ; scutellum flattened, lateral teeth very short. Wings fuscous; marginal cell sublanceolate, truncate at tip, longer than second submarginal which is elongate, narrowed about one-third towards marginal and receiving the recurrent nervure before the middle; third submarginal cell incomplete. Legs with pale pubescence, reddish on tibiæ and barsi; calcaria white. Abdomen subpetiolate, first segment nodose and densely pale ochraceous at apex, the scattered pubescence long and pale; second segment

minutely alutaceous, shining, basal margin, broader at sides, densly pale ochraceous pubescent, as well as the third, sides of fourth and narrow apical margin of second segments; venter with scattered pale pubescence, black on three apical segments; apical margin of segments 2-4 fimbriate with pale pubescence; first segment carinate, with a strong subapical tooth; second segment shining, deeply rather sparsely punctured, the discal fovea placed behind the middle, small and white pubescent.

Chapada (April). One specimen. This species somewhat resembles *cuiba*, which has black calcaria and no pale hair at base of second segment above, and the pale ochraceous pubescent band behind that segment is twice as broad as in this species.

27. **M. vidua** Klug (Nova Acta Cæs. Nat. Cur., x, p. 313, pl. xxii, fig. 11.—♂.—Length 17-20 mm.—Large, deep velvety black, opaque, the pubescence black, a few pale hairs on clypeus; eyes rounded, very convex. Scutellum convex, carinate on disk, lateral teeth prominent and truncate at tip; a large prominent obtuse tooth beneath tegulæ; metathorax broad, flattened posteriorly, coarsely reticulated, lateral margin prominent and subcarinate towards base, the upper surface with long pale silky hair and a patch of dense white pubescence on each side, sometimes confluent on disk, flanks abruptly declivous. Wings fuscous, paler at base, and with a pale hooked streak through second submarginal cell; marginal cell shorter than second and third submarginal cells combined, broadly rounded at tip; third submarginal cell extending beyond marginal, and nearly as broad beneath as above; first and second transverso-cubital nervures approximate on margiual. Legs with black pubescence, dense and white on inner side of tibiæ, long, sparse and pale on femora; calcaria white. Abdomen with basal segment coarsely punctured, subnodose, broadly constricted at apex the pubescence long and pale, with a broad dense appressed white pubescent band at apex; second segment densely finely punctured, subopaque, a patch of white pubescence on basal corners, sometimes indistinct; the extreme lateral margin finely fimbriate with white pubescence, ending in a spot at extreme apex; a similar spot on apex of third segment and sometimes on fourth; beneath shining, with black pubescence, the basal segment carinate, with a prominent compressed spine before apex; second segment deeply and sparsely punctured, with an elongate pubescent fovea on disk.

Santarem. Two specimens.

28. **M. lorena** ♂.—Length 14 mm.—Black, subopaque, the pubescence black, that on clypeus and cheeks sparse and pale. Eyes subovate, convex, polished. Scutellum convex, with a short longitudinal carina on basal middle, the lateral teeth short and truncate at apex; an acute tubercle beneath tegulæ; metathorax reticulated, the pubescence long, sparse and pale. Wings fuscous; marginal cell short, not longer than second submarginal, truncate at tip, the latter receiving the recurrent nervure between middle and base; third submarginal complete, very much narrowed beneath, triangular. Legs with black pubescence, pale sericeous on inner side of tibiæ and sparse on femora; calcaria white. Abdomen with basal segment subnodose and subconstricted at apex, the pubescence long and white, shorter and more dense on apical margin; second segment densely

and feebly punctured, shining, a little pale pubescence on basal and apical corners of segments 2 and 3; beneath shining, the first segment subdentate near apex, the second deeply and sparsely punctured, with a broad ovate, black pubescent fovea on disk, the pubescence black, slightly mixed with pale.

Chapada (February). Two specimens.

29. **M. caxara** ♀.—Length 15 mm.—Black, opaque, the pubescence black, mixed with pale on front and clypeus. Eyes round, convex. Scutellum prominent, with a smooth, shining tubercle on disk, the lateral teeth rather short and compressed; an obtuse tubercle beneath tegulæ; metathorax reticulated, upper surface flattened, sides subangulate when viewed from beneath, the pubescence long and pale, a large silvery tomentose patch on each side of the disk; tegulæ polished. Wings fuscous, paler at base, the neuration much as in *vidua*, except that the third submarginal cell is much more narrowed beneath. Legs with pale glittering pubescence, dense on tibiæ and tarsi; calcaria white. Abdomen with first segment nodose and constricted at apex, the pubescence long and pale, and when viewed from the front with two small silvery tomentose spots on apical margin; second segment feebly punctured, rather shining, with a few pale hairs on basal corners and also on apical corners of segments 2-4; beneath shining, basal segment with a short acute tooth near apex; second segment shining, deeply and sparsely punctured, the pubescence short, sparse and pale, a large elongate black pubescent fovea a little before the middle, apical margin of segments 2-4 densely fimbriate with white hair.

Chapada (March). One specimen. Larger than *lorena* which it resembles, but easily separated by the pubescence of the tibiæ and tarsi being entirely pale.

30. **M. caneta** ♀.—Length 17 mm.—Rather large, black, the pubescence black. Eyes round and convex. Scutellum prominent, with a shining discal ridge, lateral teeth short; metathorax coarsely reticulated, pubescence long and pale, a patch of dense white pubescence on each side above; a prominent obtuse tubercle beneath tegulæ. Wings fuscous, paler in the cells and with the base conspicuously hyaline; neuration much as in *vidua*, except that the third submarginal cell is smaller and more narrowed beneath. Legs with pale glittering pubescence; calcaria white. Abdomen with the basal segment elongate, nodose and constricted at apex, the pubescence long, pale and silky, on each side of the segment an elongate spot of dense, recumbent silvery-white pubescence, continued in a stripe on basal half of second segment, the latter shining, finely alutaceous; a patch of dense silvery white pubescence on sides of third segment, covering also the narrow lateral margin of the second; beneath polished, first segment carinate and briefly dentate at either end of the carina; second segment sparsely punctured with an ovate pubescent fovea on middle; apical margin of segments 2 and 3 fimbriate with white pubescence.

Chapada (October). Two specimens. A very distinct species, easily recognized by the stripe of white pubescence on each side of second abdominal segment at base above.

31. **M. almada** ♂.—Length 13 mm.—Black; head, prothorax and pleura more or less, thickly clothed with whitish pubescence, slightly mixed with black. Eyes round and very convex; base of metathorax broadly, sometimes interrupted into two spots, apex of basal segment of abdomen and basal corners of second segment densely silvery tomentose, and clothed with long pale silky hair; the apical margin of second segment, the third and fourth entirely and sides of remaining segments, clothed with longer white pubescence; mesothorax, scutellum and balance of second segment with short black pubescence, longer on apical segments; scutellum with central shining ridge, the lateral teeth short and compressed; metathorax reticulated, rounded above, declivous behind; a prominent obtuse tubercle beneath tegulæ. Wings hyaline, apical margin broadly fuscous; marginal cell short, not longer than second submarginal, truncate at tip; first submarginal about twice the length of the second, the latter receiving the recurrent nervure before the middle, the first and second transverso-cubital nervures approximate on marginal; third submarginal either incomplete or the outer nervure indistinct, triangular, narrowed to point beneath. Legs with pale pubescence, very sparse on femora; calcaria white. Abdomen with first segment subnodose and subconstricted at apex; second segment densely and finely punctured, subopaque; beneath with sparse pale pubescence, more dense on apical margin of segments 2 and 3; first segment with a strong subapical tooth; second segment deeply and sparsely punctured, with a long, narrow, discal pubescent fovea.

Chapada; Santarem.

32. **M. picada** ♂.—Length 11.5 mm.—Black; head entirely, prothorax, most of pleura, metathorax above, apical half of first segment of abdomen, nearly the basal half of second, and third and fourth entirely, clothed with dense, appressed silvery pubescence, interspersed with longer pale hair. Eyes round, convex. Mesothorax, scutellum, balance of second abdominal segment above and apical segment, clothed with black pubescence; scutellum coarsely reticulated, depressed, lateral teeth prominent, obtuse; pleura without tubercle beneath tegulæ. Wings subhyaline, broadly dusky at apex; marginal cell truncate at apex, nearly as long as second and third submarginal cells combined; outer nervure of third submarginal indistinct, the cell narrowed one half beneath; second submarginal elongate, pointed at base and receiving the recurrent nervure before the middle, the first and second transverso-cubital nervures widely separated on marginal. Legs with whitish pubescence, sparse and longer on femora; calcaria white. Abdomen with first segment elongate, nodose and constricted at apex; second segment shining, feebly punctured; beneath, the second segment is strongly and sparsely punctured, shining, with a narrow elongate discal fovea covered with white pubescence; apical margin of segments 2-4 fimbriate with pale pubescence.

Santarem. One specimen. Closely resembles *almada*, but differs by the white pubescence on head, pro and metathorax being more dense; the pleura beneath tegulæ has no prominent tubercle; the wings are darker, with differently shaped cells; the first abdominal segment more distinctly constricted at apex, the second more shining and broadly silvery tomentose at base; the pubescence on the fifth and following segments entirely black, etc.

33. **M. barra** ♂.—Length 8 mm.—Small, black; head and thorax strongly punctured, clothed with dense white appressed and subappressed pubescence, interspersed with longer erect hair; on mesothorax, scutellum, apex and flanks of metathorax the pubescence is black. Eyes rounded, convex, shining. Scutellum depressed, the lateral teeth short; no tubercle beneath tegulæ; metathorax reticulated, flanks smooth, impunctured, polished. Wings hyaline or subhyaline, pale fuscous on apical third; marginal cell broadly truncate at tip, not quite as long as first and second submarginal cells combined; second submarginal subquadrate, scarcely longer than high, not pointed at base, receiving the recurrent nervure between middle and base; third submarginal incomplete or entirely wanting. Legs with white or pale glittering pubescence, sparse on femora; calcaria white. Abdomen slender; first segment elongate, subnodose and subconstricted at apex, with long pale silky hair, the apex with a broad band of dense appressed white pubescence, indented with black on anterior middle; second segment very finely punctured, shining, the pubescence short and black, a band of dense white pubescence at base dilated laterally, and a narrow band of same on segments 3 and 4; apex with black pubescence; beneath shining, the pubescence sparse and pale; second segment deeply and sparsely punctured, with a pubescent fovea behind the middle; apical margin of second and following segments fimbriate with pale pubescence.

Chapada (September). Two specimens.

34. **M. zapara** ♂.—Length 9 mm.—Small, black; head, prothorax, pleura, postscutellum and basal half of metathorax clothed with dense silvery-ochraceous pubescence. Eyes rounded, convex, prominent. Mesothorax coarsely punctured, the pubescence black; scutellum depressed, the pubescence long erect and pale, lateral teeth short; metathorax reticulated, flanks smooth and polished; pleura without tubercle beneath tegulæ, which latter are polished black. Wings subhyaline, apical third pale fuscous, iridescent; marginal cell about as long as first submarginal, truncate at tip; second submarginal longer than high, pointed at base, narrowed one-third towards marginal, receiving the recurrent nervure before the middle; third submarginal triangular, not well defined, the outer nervure very faint. Legs black, the pubescence pale; calcaria white. Abdomen with first segment strongly punctured, the pubescence long and pale, apex broad, transversely subnodose, the apical margin reddish-brown; segments 2–4 ferruginous, shining; second segment finely punctured, the pubescence short and black, with longer pale hair at base and sides, a black stripe at extreme lateral margin; segments 3 and 4 with pale pubescence; remaining segments brown or black with black pubescence; venter polished, segments 2–4 ferruginous, the pubescence sparse and pale and apical margin fimbriate with pale hair; second segment strongly and sparsely punctured, with a white pubescent fovea behind the middle; apical segments black, the pubescence black.

Chapada (September). One specimen. This may prove to be either *oculifera* Smith, or *proxima* Smith.

35. **M. colorata** Gerst. (Archiv. f. Naturg., xl, p 315).—♂.—Length 10–16 mm.—Black; head, prothorax, pleura, sides of metathorax and apex of scutellum, densely clothed with pale ochraceous pubescence. Eyes rounded, convex, promi-

nent. Metathorax finely and closely reticulated, rounded above, abruptly sloping behind, the sides angulate near base, the pubescence long, pale, silky; pubescence on mesothorax short and black. Scutellum subconvex, lateral teeth short and compressed. Wings fuscous or pale fuscous, darker on apical third; marginal cell short, scarcely longer than second submarginal, very broadly truncate at tip; third submarginal cell indistinctly defined or incomplete, extending beyond tip of marginal; second submarginal elongate, pointed at base, receiving the recurrent nervure before the middle, the first and second transverso-cubital nervures widely separated on marginal. Legs with pale ochraceous pubescence, dense on tibiæ and tarsi; calcaria black. Abdomen with apex of first segment transversely nodose, deeply constricted on apical margin, thickly clothed with long pale pubescence; second segment minutely alutaceous, rather shining, the pubescence short and black, except on the two large rounded pale yellow spots, where it is concolorous; extreme basal corners of this segment with a few white hairs; a band of dense pale ochraceous pubescence, interrupted on middle, on segments 4 and 5, otherwise the pubescence is black; venter polished, sparsely not strongly punctured, the first segment subdentate near apex, second segment without discal fovea, segments 2–5 fringed at apex with pale pubescence, that on the remaining segments black.

Chapada. This fine species is easily recognized by the two large pale yellow spots on second segment of abdomen above.

36. **M. tapera** ♂.—Length 16 mm.—Large, black, with black pubescence. Eyes ovate, convex, polished. Scutellum convex, lateral teeth obtuse; pleura with an obtuse tubercle beneath tegulæ; metathorax rather coarsely reticulated, flattened and declivous posteriorly, clothed with long pale silky pubescence. Wings fuscous, extreme base and a curved line through the first two submarginal cells, ending in a short oblique line or spot in second discoidal cell, subhyaline; third submarginal cell complete, subtriangular, narrowed, one half beneath; marginal cell not longer than second submarginal, the truncate apex not extending beyond third submarginal; second submarginal elongate, pointed at base, receiving the recurrent nervure a little before the middle, the first and second transverso-cubital nervures closely approximate on marginal. Legs with black pubescence, pale sericeous on inner side of tibiæ and tarsi; calcaria white. Abdomen with basal segment elongate, nodose and constricted at apex, confluently punctured, and clothed with long, pale silky pubescence, more dense and white on each side at apex; remaining segments above finely alutaceous, the pubescence black, except a small patch at basal corners of second and a small spot at extreme apical corners of second and third segments which are white or pale ochraceous; venter shining, second segment polished, sparsely punctured, without discal fovea, the extreme basal middle pinched, the pubescence black, except on first, base of second, and fringe on apex of segments 2 and 3, where it is whitish.

Chapada Campo (September). A specimen from Chapada (October) differs in having the pubescence on sides of metathorax, first abdominal segment at apex, and the second at base more dense and white, that on the first at apex and base of second being appressed and sericeous.

37. **M. serra** ♂.—Length 11 mm.—Small, black, the pubescence mostly black, white on clypeus; head and thorax, except metathorax, closely, confluently punctured. Eyes ovate, convex, prominent. Scutellum convex, the lateral teeth prominent, obtuse; the metathorax rather coarsely reticulated, the reticulations larger at base, the pubescence long, scattered and pale; a sharp spine beneath tegulæ. Wings uniformly fuscous, except a pale streak in second submarginal cell and a spot beneath its apex; marginal cell as long as second and third submarginal cells combined, broadly rounded at tip, and not extending beyond apex of third submarginal, which is complete and much narrowed beneath; second submarginal elongate, receiving the recurrent nervure before the middle, the first and second tranverso-cubital nervures widely separated on marginal. Legs nigro-piceous, the pubescence brown or black; calcaria testaceous. Abdomen slender, the pubescence black, except on first segment and a few scattered hairs at base of second where it is whitish; first segment elongate, nodose and constricted at apex, punctured; second and following segments very minutely punctured, somewhat shining; venter polished, second segment sparsely and finely punctured, the pubescence black, some scattered pale hairs on first and base of second segments.

Chapada. One specimen. Resembles *tapera* somewhat, but smaller, the tubercle beneath tegulæ acute, the abdomen less strongly punctured, and the neuration of anterior wings different.

38. **M. viana** ♂.—Length 10 15 mm.—Black, the pubescence black; head and thorax, except metathorax, closely, confluently punctured. Head small, transverse; eyes ovate, very convex. Scutellum convex, with a central shining tubercle, lateral teeth compressed, not prominent; metathorax coarsely reticulated, depressed and declivous posteriorly, clothed with long pale pubescence; an obtuse tubercle beneath tegulæ. A large spot on vertex between the eyes, a broad band on apex of first abdominal segment, basal corners of second segment, and a band, interrupted on disk above, occupying the third, and narrow apical margin of second segment, clothed with dense, more or less appressed, and interspersed with long, whitish pubescence; some pale hair also on clypeus. Wings fuscous, with more or less of base and a large spot about middle of anterior pair, subhyaline; three complete submarginal cells; marginal truncate at tip, scarcely longer than second submarginal and not reaching to apex of third submarginal, which latter is scarcely narrowed beneath; second submarginal cell receiving the recurrent nervure before the middle, the first and second transverso-cubital nervures approximate on marginal. Legs black, with black pubescence, that on coxæ and femora beneath sparse, long and pale; calcaria testaceous. Abdomen with first segment transversely nodose and constricted at apex, the second and following segments closely and finely punctured, somewhat shining; the venter polished, deeply and sparsely punctured; second segment without a discal fovea, somewhat pinched at extreme base.

Chapada. One specimen, probably only a variety, has no patch of white pubescence on vertex, and the calcaria are white.

39. **M. sabara** ♂.—Length 10–12 mm.—Black; head and thorax closely and rather coarsely punctured, metathorax reticulated; the head above, pro- and mesothorax, and abdomen above behind base of second segment, clothed with short black pubescence, longer on sides and apex; face, clypeus, cheeks and thorax beneath with pale glittering pubescence. Eyes rounded, convex, prominent. Scutellum depressed, the pubescence long and erect, lateral teeth prominent, suberect, polished; pleura without tubercle beneath tegulæ; metathorax with a patch of dense whitish tomentose on disk, sometimes separated into two spots. Wings pale fuscous, extreme base and a streak beneath stigma pale; marginal cell scarcely as long as second and third submarginal cells combined, rounded at tip; second submarginal a little longer than high, narrowed one half above, receiving the recurrent nervure before the middle; third submarginal subtriangular, not extending beyond tip of marginal. Legs with pale glittering pubescence, more dense on tibiæ and tarsi; calcaria white. Abdomen shining behind first segment, which is nodose at apex and subconstricted, thinly clothed with long white hair, the apical half densely silvery sericeous tomentose; second and following segments feebly punctured, the pubescence black, base of second segment with a narrow band of dense silvery sericeous pile, broadened laterally; sides of segments 3 and 4 with a patch of long white pubescence; venter shining, clothed with pale glittering pubescence, more dense on apical margin of segments 2–4; apex black; second segment feebly and sparsely punctured, without discal fovea.

Chapada; Santarem.

40. **M. taboca** ♂.—Length 10–12 mm.—Closely allied to *sabara* and may be only a variety, but differs by the pubescence of the legs, except tarsi, being black, and the third abdominal segment above has a silvery sericeous pubescent band, generally more or less broadly interrupted medially.

Chapada.

41. **M. maraca** ♂.—Length 12–14 mm.—Slender, black, shining. Head rather finely and closely punctured, clothed with glittering griseous pubescence, more dense and silvery on clypeus and cheeks; eyes large, ovate, prominently convex. Thorax coarsely punctured, metathorax reticulated; mesothorax with short black pubescence, on prothorax, pleura and metathorax it is silvery sericeous, dense on metathorax above, which latter is also clothed with long pale silky hair; a prominent subacute spine beneath tegulæ; scutellum reticulated, convex, lateral teeth long, prominent, the somewhat hooked tips directed inward; metathorax broadly rounded posteriorly and prominent laterally. Wings hyaline, apex broadly and tip of basal cell subfuscous; marginal cell broadly rounded at apex, as long as second and third submarginal cells combined; second submarginal elongate, narrowed one-fourth on marginal, receiving the recurrent nervure between middle and base; third submarginal small, triangular, reaching almost to apex of marginal. Legs rather slender, the pubescence silvery sericeous, most dense on tibiæ and tarsi; calcaria white. Abdomen slender, the first segment elongate, narrow, nodose at apex, clothed with dense, appressed, silvery sericeous pubescence, interspersed with long white silky hair; second segment feebly punctured, polished, basal half and sides covered with dense appressed silvery sericeous pubescence, as are also segments 3 and 4, and base of 5,

with long pale silky hair on sides; on apical half of second and on apical segments the pubescence is black; beneath, the second segment is strongly and sparsely punctured, shining, and without discal fovea; segments 2–4 fringed at apex with pale glittering pubescence.

Santarem.

42. **M. acara** ♂.—Length 8 mm.—Very much like *barra*, but there is no discal fovea on second ventral segment; the marginal cell is longer, and the second submarginal is very much longer than high; the third submarginal is complete, with the outer nervure faint; legs piceous, with pale pubescence; narrow apical margin of second abdominal segment, segments 3 and 4 entirely and most of 5, clothed with pale ochraceous pubescence; otherwise like *barra*.

Chapada (October). Two specimens.

43. **M. pomba** ♂.—Length 9 mm.—Small, slender, black. Head with pale glittering pubescence, mixed with black on the vertex, protuberant behind the ocelli, which latter are of the usual size; the eyes round, convex, prominent. Thorax strongly, closely punctured, with short black pubescence above, mixed with pale on prothorax; the pleura and metathorax dense silvery tomentose; anterior margin of prothorax carinate, anterior angles acute; scutellum convex, lateral teeth short; metathorax reticulated, the pubescence long, pale and silky; no tubercle beneath tegulæ. Wings fusco-hyaline, with a brassy reflection; marginal cell long, lanceolate, pointed at apex; second submarginal short, subquadrate, pointed at base, only slightly narrowed towards marginal, receiving the recurrent nervure at about the middle, second transverso-cubital nervure straight; third submarginal cell incomplete. Legs slender, the pubescence and calcaria pale. Abdomen long, slender, petiolate, basal segment narrow, as long as second segment, nodose and constricted at apex, sparsely clothed with pale pubescence, as is also base and sides of second segment, which latter is smooth and polished, impunctate except at tip, clothed with short black pubescence on disk and apex; remaining segments with black pubescence more or less mixed with pale, especially on sides; venter shining, the pubescence sparse and pale; second segment sparsely punctured, without discal fovea.

Santarem. One specimen. This seems allied to *tenuis* Smith.

The following species belong to the subgenus *Photopsis*, and are the only two found in the collection. They are not included in the table given on page 56, etc.

M. gracilescens Smith (Descr. New Spec. Hym. Brit. Mus. 1879, p. 222). — ♂.—Length 12 mm.—Head black, impunctate, shining, with long sparse pale hair; eyes and ocelli large, prominent, convex; palpi pale testaceous. Thorax pale honey-yellow, finely punctured, the pubescence long and pale; metathorax reticulated, the basal middle with three long longitudinal carinæ. Wings subhyaline, nervures testaceous, costa and stigma brown; marginal cell long, lanceolate, pointed at tip; first submarginal narrow, oblique, the second subquadrate,

pointed at base, truncate at apex, third submarginal obsolete. Legs blackish, the pubescence pale; coxæ and trochanters honey-yellow; calcaria long, slender, pale. Abdomen petiolate, shining black, thickly clothed, except on first and basal half of second segment, with long dense appressed whitish pubescence, and when viewed from the front the abdomen is densely silvery white pubescent behind second segment; first segment ferruginous above and beneath, blackish on apical margin above; second segment feebly punctured, polished, basal middle sparsely pubescent, sides and apex thickly so; apex of second and following ventral segments much less densely pubescent than those above; apical segment flat, subquadrate, sparsely punctured, margined laterally, the two apical spines honey-yellow.

Chapada (October). One specimen. This agrees tolerably well with Smith's description, except that the coxæ are rather finely punctured and not reticulated.

M. valenca ♂.—Length 14 mm.—Deep black, opaque; head, pro- and mesothorax and pleura closely punctured, with erect or suberect black pubescence, except on mouth parts and pleura where it is pale, and longer on head and prothorax; metathorax rather coarsely reticulated, and with several large elongate cells on basal middle, the pubescence long and pale; eyes and ocelli as in preceding species. Wings fusco-hyaline, the base and a blotch at apex of second submarginal cell hyaline; nenration much as in *gracilescens*, except that the second submarginal cell is longer, and the subtriangular third is complete, except lower portion of outer nervure which is indistinct. Legs brown black, thickly pale pubescent; coxæ pale sericeous tomentose; calcaria pale. Abdomen black, shining, finely punctured; first segment clothed with long erect pale hair; second segment thickly pale pubescent on sides and apex, almost nude on basal middle; when viewed from above the abdomen has a broad band of dense appressed whitish pubescence occupying apex of second segment, and 3 and 4 entirely, while the following segments are rather thickly black pubescent; beneath, the second segment is smooth, shining, very sparsely and feebly punctured; apex of segments 2 and 3 fimbriate with pale pubescence, behind these the pubescence is black; apical segment rounded, not margined laterally, the two apical spines honey-yellow.

Rio de Janerio (November). One specimen.

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NOTES ON ORTHOPTERA FROM OKLAHOMA AND INDIAN TERRITORY, WITH DESCRIPTIONS OF THREE NEW SPECIES.

BY A. N. CAUDELL, WASHINGTON, D. C.

During the past summer my wife made a small collection of the Orthoptera in Oklahoma, and also collected a few specimens in the Indian Territory. The material numbers in all nearly 200 specimens constituting 33 species, three of which are apparently undescribed. The following notes are based upon this collection and a few specimens collected by myself in the two Territories at various times during the past nine years. Many of the species are mentioned merely as a matter of record:

(1.)—Dabia minor Linn.

Forficula minor Linn., Syst. Nat. ed., x, i, 423 (1758).

One male; Stillwater, Payne Co., Oklahoma, April 23, 1893.

(2.)—Ischnoptera pennsylvanica De Geer.

Blatta pennsylvanica De Geer, Mem., iii, 537, pl. 44, fig. 4 (1773).

One immature specimen under bark in the Creek Nation, Indian Territory, May 31, 1901; and two mature individuals from Stillwater, Oklahoma, in 1893. This species has not, I believe, been recorded so far south, and the specimens in my possession may belong to an allied species, though they seem to agree perfectly with typical northern species.

(3.)—Stylopyga orientalis Linn.

Blatta orientalis Linn., Syst. Nat. ed., x, i, 424 (1758).

Stillwater, Oklahoma, 1892.

(4.)—Blatta germanica Linn.

Blatta germanica Linn., Syst., Nat. ed., xii, ii, 688 (1767).

Stillwater, Okla., 1893.

(5.)—Stagmomantis carolina Linn.

Gryllus (Mantis) carolina Linn., Cent. Ins. Rar., 13 (1763).

Two males, one female; Perkins, Payne Co., Okla., Oct. 7, 1901.

(6.)—Diapheromera velieii Walsh.

Diapheromera velieii Walsh, Proc. Ent. Soc., Philada., iii, 410 (1864).

One male; Stillwater, Okla., 1894. I have seen some twelve or fifteen specimens of Diapheromera from Oklahoma and all of them proved to be the above species.

(7.)—**Tettix ornatus** Say.

Acridium ornatus Say, Amer. Ent., pl. 5 (1824).

Collected in Payne Co., Okla., in 1893. It probably occurred in some numbers, but I have but one specimen preserved, a female. Prof. A. P. Morse is the authority for this determination.

(8.)—**Tettigidea lateralis** Say.

Acridium lateralis Say, Amer. Ent., pl. 5 (1824).

Tettix polymorpha Burm., Handb. Ent., ii, 659 (1838).

Stillwater, Okla., 1892–1897. Both forms occur in considerable abundance.

(9.)—**Mermiria alacris** Scudd.

Mermiria alacris Scudd., Proc Bost. Soc. Nat. Hist., xix, 30 (1877).

Stillwater, Okla., 1893. Prof. Brunner is the authority for this determination.

(10.)—**Mermiria bivittata** Serv.

Opsomala bivittata Serv., Orth., 589 (1839).

Three males, three females; Perkins, Okla., Aug. 13–16, 1901.

(11.)—**Mermiria neomexicana** Thom.

Opomala neomexicana Thom., Proc. Acad. Nat. Sc. Philad., 1870, 77 (1870).

Two females, Cherokee Nation, Indian Territory, in 1896; two males at Perkins, Okla., Aug. 13, 1901.

(12.)—**Mermiria rostrata** McNeill.

Mermiria rostrata McNeill, Proc. Davenp. Acad. Nat. Sc., vi, 205, 207–208, pl. i, fig. 3 (1897).

One male, one female; near Perkins, Okla., Aug. 13, 1901.

(13.)—**Syrbula admirabilis** Uhl.

Stenobothrus admirabilis Uhl., Proc. Ent. Soc. Philad., ii, 553 (1864).

Three males, three females; Perkins, Okla., August, 1901. Also at Stillwater, Okla., in 1893.

(14.)—**Orphulella picturata** Scudd.

Orphulella picturata Scudd., Can. Ent., xxxi, 178, 182 (1899).

One female specimen collected on August 12th at Perkins, Okla. It agrees with Scudder's description.

(15.)—**Ageneotettix scudderi** Brun.
Aulocara scudderi Brun., Proc. U. S. Nat. Mus., xii, 63–64 (1890).

Stillwater, Okla., in 1892. Identified by Prof. Brunner.

(16.)—**Arphia carinata** Scudd.
Œdipoda carinata Scudd., Trans. Amer. Ent. Soc., ii, 306 (1869).

This specimen was collected at Stillwater in 1892, and identified by Prof. Brunner at that time. The specimen is no longer in my possession.

(17.)—**Arphia conspersa** Scudd.
Arphia conspersa Scudd., Proc. Bost. Soc. Nat. His., xvii, 514 (1875).

One male; Stillwater, Okla., 1897.

(18.)—**Arphia sulphurea** Fabr.
Gryllus sulphurea Fabr., Spec. Ins., i, 369 (1781).

Stillwater, Okla., 1892 to 1897; Perkins, Okla., 1901.

(19.)—**Arphia xanthoptera** Burm.
Œdipoda xanthoptera Burm., Handb. Ent., ii, 643 (1838).

Two females, Stillwater, Okla., 1892; two males, Perkins, Okla., Aug. 13, 1901.

(20.)—**Chortophaga viridifasciata** DeGeer.
Acrydium viridifasciata DeGeer, Mem., iii, 498, pl. 42, fig. 6 (1773).

Stillwater and Perkins, Okla. Very common, green and brown forms occurring in equal abundance.

(21.)—**Hippiscus phœnicopterus** Burm.
Œdipoda phœnicopterus Burm., Handb. Ent., ii, 643 (1838).

One female, Stillwater, Okla., 1892; two males, three females, Perkins, Okla., August, 1901.

(22.)—**Hippiscus tuberculatus** Palis.
Acridium tuberculatus Palis., Ins. Afr. Amer., 145, pl. 4, fig. 1 (1817).

One large female, collected in Cherokee Nation, Indian Territory, in 1894.

(23.)—**Hippiscus variegatus** Scudd.
Hippiscus variegatus Scudd., Psyche, vi, 268, 301 (1892).

Identified by Prof. Bruner from specimens collected at Stillwater, Okla., in 1893.

(24.)—**Dissosteira carolina** Linn.
Gryllus (Locusta) carolina Linn., Syst. Nat., ed. x, i, 433 (1758).

Very common at Perkins, Okla.

(25.)—**Dissosteira longipennis** Thom.

Œdipoda longipennis Thom., Ann. Rept. U. S. Geol. Surv. Terr., v, 463 (1872).

One female; Perkins, Okla., Aug. 16, 1901. Collected by Miss Lulu Cundiff.

(26.)—**Spharagemon cristatum** Scudd.

Spharagemon cristatum Scudd., Proc. Bost. Soc. Nat. Hist., xvii, 470 (1875).

Two males; Perkins, Okla., Aug. 16, 1901. Collected by Mr. Orvil Cundiff.

(27.)—**Trimerotropis cincta** Thom.

Œdipoda cincta Thom., Proc. Acad. Nat. Sc. Philada., 1870–80 (1870).

Collected in 1892 at Stillwater, Okla., and identified by Prof. Bruner.

(28.)—**Trimerotropis citrina** Scudd.

Trimerotropis citrina Scudd., Bull. U. S. Geol. Sur. Terr., ii, 265 (1876).

One male, one female; Stillwater, Okla., 1893. Several specimens of both sexes at Perkins, Okla., in August, 1901, by Mr. Vivian Cundiff.

(29.)—**Hadrotettix trifasciatus** Say.

Gryllus trifasciatus Say, Amer. Ent., iii, pl. 34 (1828).

Stillwater, Okla., 1893.

(30.)—**Brachystola magna** Gir.

Brachypeplus magna Gir., Marcy Expl. Red River, 260, pl. 15, figs. 1-2 (1853).

Not usually common. Collected several miles southwest of Stillwater, Okla.

(31.)—**Schistocerca alutacea** Harr.

Acridium alutacea Harr., Ins. Inj. Veg., 139 (1841).

Five males, three females; Perkins, Okla., Aug. 18, 1901.

(32.)—**Schistocerca americana** Drury.

Gryllus americana Drury, Ill. Nat. Hist., i, 128. pl. 49, fig. 2 (1770).

Very common in the valley of the Cimarron River near Perkins, Okla., and is found commonly throughout both Oklahoma and the Indian Territory. In 1895 I saw a large female in active flight on the 18th of January in the Cherokee Nation, Indian Territory.

(33.)—**Schistocerca damnifica** Sauss.

Acridium damnifica Sauss., Rev. Mag. Zool., 1861, 164 (1861).

Typical specimens from Perkins, Okla., in May, 1901.

(34.)—Melanoplus atlanis Riley.

Caloptenus atlanis Riley, Ann. Rep. Ins. Mo., vii, 169 (1875).

Stillwater, Okla., 1893.

(35.)—Melanoplus bispinosus Scudd.

Melanoplus bispinosus Scudd., Proc. Amer. Phil. Soc., xxxvi, 25, 34 (1897).

One male, one female; near Perkins, Okla., Aug. 16, 1901.

(36.)—Melanoplus bivittatus Say.

Gryllus bivittatus Say, Journ. Acad Sc. Philad., iv, 308 (1825).

Stillwater, Okla., 1893.

(37.)—Melanoplus differentialis Thom.

Acridium differentialis Thom., Trans. Ill. State Agric. Soc., v, 450 (1865).

Very common all over Oklahoma and Indian Territory.

(38.)—Melanoplus inconspicuus n. sp.—General color testaceous, paler beneath. Head not prominent, not elevated above the thorax, with a black postocular band. Interspace between the eyes slightly wider than the basal segment of the antennæ. Fastigium steeply declivent, broadly sulcate. Frontal costa percurrent, shallowly sulcate at and below the ocellus, coarsely punctate throughout. Eyes moderately prominent. Antennæ light reddish brown, darker on outer third. Pronotum with a shiny black band bordering the upper half of the lateral lobes, broader behind. Disk broadly convex, passing with a narrowly rounded angle into the subperpendicular lateral lobes. Median carina percurrent, slight but distinct. Front margin of the pronotum truncate, inconspicuously emarginate, posterior margin obtusely and roundly angulate. Prozona slightly longer than the metazona. The sides of the metathorax below the base of the wings are black with a prominent light-colored carina extending obliquely across them from the hind coxial cavities to the humeral angle. Prosternal spine extraordinarily large, almost bulbous and strongly retrorse. Interspace between the mesosternal lobes quadrate. Tegmina abbreviate, as long as the pronotum, moderately broad, overlapping and narrowing rapidly to a narrowly rounded apex. Posterior femora pale testaceous, a little darker above and with dusky genicular arcs. Hind tibiæ testaceous, spines black nearly to the base, twelve in number in outer series. Abdomen compressed, apex not swollen. Supraanal plate triangular, mesially sulcate throughout, narrowly and deeply at base, broadly at apex. The borders of the sulcus and the margin of the plate itself, especially the former, are considerably elevated. Just where the sulcus commences to broaden posteriorily it is interrupted by a transverse ridge and from that point backwards the tip is slightly inclined downwards. Furcula absent. Cerci moderately broad, narrowed considerably above in basal third, apically rounded and broadly sulcate, the entire cerci gently incurved, the extreme tips, however, parallel. Subgenital plate with lateral margins meeting with a rounded curve, not noticeably tuberculate. Length of body, 20 mm.; antennæ, 8.5 mm.; pronotum, 5 mm.; tegmina, 5.5 mm.; posterior femora, 12 mm.

One male; Creek Nation, Indian Territory, near Arlington, Okla., May 31, 1901, by Mrs. Nellie Caudell.

Type No. 6118, U. S. Nat. Mus.

This species belongs to the Fasciatus series of the genus *Menaloplus* and is allied to *juvenicus* Scudd, but the angulated posterior margin of the pronotum, larger retrorse prosternal spine, and the absence of the furcula, will serve to distinguish it from that more southern species. The cerci of the two species are very similarly shaped.

(39.)—**Melanoplus minor** Scudd.

Caloptenus minor Scudd., Proc. Bost. Soc. Nat. His., xvii, 478 (1875).

Two males, one female; Perkins, Okla., May 28, 1901. This locality is somewhat south of the usual range of this species.

(40.)—**Melanoplus packardii** Scudd.

Melanoplus packardii Scudd., Proc. Bost. Soc. Nat. Hist., xix, 287 (1878).

One male; Perkins, Okla., Aug. 16, 1901.

(41.)—**Melanoplus spretus** Thom.

Acridium spretis Thom., Trans. Ill. State Agri. Soc., v, 450 (1865).

This species occurs in both Oklahoma and Indian Territory, though I have none of my collecting.

(42.)—**Scudderia curvicauda** DeGeer.

Locusta curvicauda DeGeer, Mem., iii, 446, pl. 38, fig. 3 (1773).

One male, Stillwater, Okla., 1893; one female, Ringo, Cherokee Nation, Indian Territory, August 1896.

(43.)—**Microcentrum laurifolium** Linn.

Gryllus (Tettigonia) laurifolium Linn., Syst. Nat., ed. x, i, 429 (1758).

One female; Perkins, Okla., Aug. 13, 1901.

(44.)—**Microcentrum retinerve** Burm.

Phylloptera retinervis Burm., Handb. Ent., ii, 692 (1838).

One male; Stillwater, Okla., 1893.

(45.)—**Conocephalus crepitans** Scudd.

Conocephalus crepitans Scudd., Proc. Bost. Soc. Nat. His., vii, 450 (1862).

Three females; Perkins, Okla., August, 1901.

(46.)—**Conocephalus triops** Linn.

Gryllus (Tettigonia) triops Linn., Syst. Nat., ed. x, i, 430 (1758).

One female, Stillwater, Okla., 1893; one female, Perkins, Okla., 1901.

(47.)—**Orchelimum nigripes** Scudd.

Orchelimum nigripes Scudd., Proc. Bost. Soc. Nat. Hist., xvii, 459 (1875).

One female, Stillwater, Okla., 1894; one male, Ringo, Cherokee Nation, Indian Territory, 1896.

(48.)—**Xiphidium strictum** Scudd.

Xiphidium strictum Scudd., Proc. Bost. Soc. Nat. Hist., xvii, 460 (1875).

One female, Ringo, Cherokee Nation, Indian Territory, 1896; one nymph, Perkins, Okla., 1901.

(49.)—**Orchesticus nigromarginata** n. sp.—Color reddish yellow, probably lighter in life, with a broad black band on each side extending along the entire length of the insect, surrounding the eyes and mottling the face in front and extending nearly to the end of the abdomen behind, sometimes becoming obsolete towards the tip. On the thorax it is very conspicuous and is broader on the anterior part. On the head it becomes diffused, and beyond the eyes exists only as a fuscous mottling on the face, the mottling assuming a somewhat perpendicularly striated appearance. Vertex polished, light above with sides black. Fore tibiæ with three spines above and two rows of six each below. Middle tibiæ with a double series of spines above and below and the posterior tibiæ spined on the outer three-fourths, one series below and two above, the spines much shorter than those on the anterior and intermediate tibiæ, those on the lower side being minute. Anterior femora with a single minute black spine on the base of the outer third of the inner inferior carina. Middle femora unarmed. Hind femora very long, swollen at base and armed on the inner inferior carina with several small black spines. Oviposition nearly straight on the basal two-thirds, the end slightly curved upwards, color dark reddish, apically growing darker. Length of antennæ, about 50 mm.; pronotum, 9 mm.; anterior femora, 8 mm.; posterior femora, 27 mm.; posterior tibiæ, 27 mm.; ovipositor, 20 mm.

Type No. 6119, U. S. Nat. Mus.

Described from one female collected in Texas by Belfrage.

In the collection brought home by my wife was one female of this species collected at Perkins, Okla., Aug. 13, 1901. This specimen has the ovipositor only 18 mm. in length, but otherwise it agrees with the type. This species comes near to *O. americana* Sauss., but the shorter ovipositor and the different coloration will serve to distinguish it from that species. The spined posterior femora and shorter pronotum will separate it from *O. cragini* Brun.

(50.)—**Ceuthopilus pinguis** Scudd.

Ceuthophilus pinguis Scudd., Proc. Amer. Acad. Arts Sc., xxx, 29, 86–87 (1894).

One female, Stillwater, Okla., 1896; three males, two females, Perkins, Okla., August, 1901. I have seen this insect in large num-

bers in "cyclone caves," where they eat any insects, including each other, that comes in their way.

(51.)—**Udeopsylla gigantea** Brun.

Daihinia gigantea Brun., Bull. Washb. Coll., i, 127 (1885).

One male, Stillwater, Okla, 1895. This insect plainly belongs to the genus *Udeopsylla*, as all the characters indicate. All the tarsi are four jointed and the subgenital plate of the male is not greatly fissured. Prof. Bruner writes me that the type specimen had the tarsi mutilated.

(52.)—**Gryllotalpa borealis** Brun.

Gryllotalpa borealis Brnn., Handb Ent., ii, 740 (1838).

One female, one nymph; Stillwater, Okla., 1894. The first stridulation of this species was heard at Stillwater that year on the 10th of March.

(53).—**Miogryllus oklahomæ** n. sp.—A moderately stout species, black above, below pale testaceous, especially on thorax, scarcely so on abdomen. Head large, broader than the thorax and glistening black, palpi somewhat paler. Antennary fossæ above, ocelli, and a spot on each side of the head below the hinder part of the eye, pale yellow. Antennæ fuscous, basal segment shiny black. Pronotum dark fuscous above, pale testaceous below; nearly twice as wide as long, regularly and considerably decreasing in width from in front backwards and with a longitudinal depressed spot on the anterior half of the disk; posterior margin truncate, interior margin very slightly concave, lateral lobes nearly vertical in front, considerably bent inward posteriorly and with the lower margin considerably elevated and ascending from in front backwards. Tegmina as long as the body, well rounded posteriorly. The mediastinal vein is one-branched and there is a third "oblique" vein present. Wings hidden beneath the elytra, probably aborted. Legs fuscous, paler below towards the base. Anterior tibiæ with the foramen distinct but small on the inner side and large on the outer side, fully a third as long as the tibiæ. Posterior tibiæ less than two-thirds as long as the hind femora and with five yellow, dusky tipped spines on each side above. Length of pronotum, 2 mm.; elytra, 5 mm.; posterior femora, 8 mm.; posterior tibiæ, 5 mm.; width of pronotum in front, 4 mm.; behind, 3.5 mm.

Type No. 6120 U. S. Nat. Mus.

One male; Perkins, Okla., May 16, 1901, by Mrs. Nellie Caudell.

The one-branched mediastinal vein, short posterior tibiæ bearing but five spines on each side and the small size all go to prove this insect a species of *Miogryllus*. The presence of a third "oblique" vein is a discordant character, but Prof. Bruner thinks it belongs to that genus without doubt, and so I place it here with but little hesitation. It seems quite distinct from any described species of *Miogryllus*.

(54.)—**Gryllus abbreviatus** Serv.

Gryllus abbreviatus Serv., Orth., 336 (1839).

One female, Stillwater, Okla., 1893; one female, Perkins, Okla., Aug. 6, 1901.

(55.)—**Gryllus luctuosus** Serv.

Gryllus pennsylvanicus DeG., Orth., 335 (1839).

Two males, six females, Perkins, Okla., April–August, 1901; one female, Creek Nation, Indian Territory, May 31, 1901.

The males are short winged forms, but the female are all macropterous.

(56.)—**Gryllus domesticus** Linn.

Gryllus (*Acheta*) *domesticus* Linn., Syst. Nat., ed. x, i, 428 (1758).

One male, two females, two nymphs; Perkins, Okla., August, 1901.

(57.)—**Œcanthus nigricornis** Walk.

Œcanthus nigricornis Walk., Cat. Derm. Salt. Brit. Mus., i, 93 (1869).

One male, one female; Stillwater, Okla., 1895.

REVISION OF THE CICINDELIDÆ of Boreal America.

BY CHARLES W. LENG, B. S.

The earliest reference to American species in the literature of this family is in 1735 when *Cicindela* (now *Tetracha*) *carolina* and *virginica* were described by Linné. In 1775 Fabricius gave names to *marginata*, *sexguttata* and *unipunctata*. In 1795 Olivier described *punctulata* and *purpurea*. In 1801 Fabricius added *abdominalis*, *micans*, *violacea* and *marginalis*, the last being a synonym of *purpurea*.

Thomas Say, in 1817, was able to recognize most of the preceding names and added seven more, viz.: *dorsalis*, *formosa*, *hirticollis*, *pusilla*, *vulgaris*, *decemnotata* and *obscura*, the last being now known as *modesta*, Say's name being preoccupied. The description of species by various authors increased the total number, so that in 1856 Dr. Leconte recognized sixty five species in his Revision of the Cicindelidæ (Trans. Am. Phil. Soc. xi, pp. 27–62, with plate), on which paper the present one is largely based. In 1883, many new species having been described in the interval, Prof. F. G. Schaupp published a complete revision of the family (Bull. Brooklyn Ent. Soc. vi, pp. 73–125, with five plates), in which 114 species and varieties are enumerated. To this paper also I am indebted for much help. Since 1883, the most important contribution to the literature of the family is the paper of Major Thomas L. Casey (Ann. Lyc., 1896), in which the genus *Omus* is treated in synoptic form and sixteen new names are proposed. Other authors have added to our knowledge of the family, and I have drawn freely on the writings of Dr. Walther Horn, Prof. Wickham, Mr. Charles Dury, Mr. Warren Knaus and Mr. H. C. Fall.

It is a pleasure to acknowledge the assistance I have derived from the published statements of these authors and, in the case of those who are still living, from the liberal notes I have had from them in correspondence. I am also deeply indebted to Mr. Edward Doubleday Harris, who has kindly read the manuscript and corrected some errors, and to whom is due the credit for the differentiation of the puzzling *repanda* group and, in part, the differentiation of *sexguttata* and *patruela*. In equal measure I owe much to Dr. Edwin C. Van Dyke, of San Francisco, for without his assistance and his intimate

acquaintance with the species of *Omus* inhabiting the High Sierra, derived from personal collecting and most freely imparted, that portion of my paper could not have been written. I have received generous use of specimens of rare species from many friends, among whom are my dear old friend, Charles Fuchs, of San Francisco, who has loaned the types of *Omus ambiguus*, *Cicindela perviridis* and *C. lunalonga*, and Mr. Knaus, Prof. Wickham, Mr. H. W Wenzel and Mr. Fred. C. Bowditch.

A large number of my friends have helped me by the donation of specimens and manuscript notes on their collecting experiences and, in this connection, I am under obligation to most of those whose names are already mentioned, and to Messrs. E. J. Oslar, George Coverdale, William S. Marshall, Norman Criddle, Frederick Blanchard, Ezra J. Nolt, Lawrence Bruner, J. E. Desrochers, J. J. Rivers, L. E. Hood, F. L. Washburn, G. W. Browning, A. Luetgens, C. Schaeffer, C. Crozet, F. F. Crevecoeur, Roland Hayward, F. E. Blaisdell, C. H. Roberts and J. D. Sherman, Jr. I also owe thanks to Mr. Samuel Henshaw for the facilities afforded me in examining the types of Dr. Leconte, and to Dr. Henry Skinner for the same kindness in connection with the collection of Dr. Horn.

For my own part, I have diligently collected this family in the Pine Barrens of New Jersey for the last three years, usually with Mr. William T. Davis, and have thus acquired an acquaintance with their individual variations in the field. I have compared my specimens with the types in the Horn and Leconte collections and with some of the types of Schaupp. I have taken the opinion on some doubtful points of those students whose location gave them the best opportunity of seeing the insects alive and in numbers. I have read carefully all the printed matter in relation to the family that I could find, and I trust the final result may prove satisfactory to the reader. I hope also that he may be prompted to make known the local races of *Cicindela* he meets, for the point I desire to emphasize as the result of two years' study of this genus is that the difference between geographic races and species is one of degree only, and that our knowledge of the genus cannot be completed by "lumping" the described races because they are closely allied, but can be increased by making known every constant difference that is exemplified by a series of specimens.

I have followed the existing practice by using the term "variety" for forms that differed slightly, and I have refrained from describing

any forms from single specimens. Some of these doubtless represent undescribed species, but individual "sports" occur repeatedly, and with single specimens it is difficult to decide the correct status.

The following is the list of species and varieties known to me, 149 in all.

AMBLYCHILA *Say.*
cylindriformis *Say.*
Piccolominii *Reiche.*
Baroni *Rivers.*

OMUS *Esch.*
Dejeani *Reiche.*
♀
Edwardsii *Cr.*
var. montanus *Casey.*
Audouinii *Reiche.*
submetallicus *Horn.*
californicus *Esch.*
var. sculptilis Casey.
sequoiarum *Cr.*
var. Hornii *Lec.*
ambiguus *Schaupp.*
Lecontei *Horn.*
var. elongatus *Casey.*
laevis *Horn.*
intermedius *n. sp.*

TETRACHA *Hope.*
carolina *Linn.*
virginica *Linn.*

DROMOCHORUS *Guér.*
Pilatei *Guér.*
Belfragei *Sallé.*

CICINDELA *Linn.*
celeripes *Lec.*
cursitans *Lec.*
♀
obsoleta *Say.*
var. prasina *Lec.*
vulturina *Lec.*
var. Santaclaræ *Bates.*
♀
unipunctata *Fab.*
♀
longilabris *Say.*
var. Laurentii *Schaupp.*
var. Oslari *n. var.*
var. montana *Lec.*
var. vestalia *n. var.*
perviridis *Schaupp.*
♀
scutellaris *Say.*
var. unicolor *Dej.*
var. modesta *Dej.*
var. nigrior *Schaupp.*
var. rugifrons *Dej.*
var. Lecontei *Hald.*
♀
nigrocoerulea *Lec.*
robusta *n. sp.*
Bowditchi *n. sp.*
♀
pulchra *Say.*
Hornii *Schaupp.*
pimeriana *Lec.*
♀
sexguttata *Fab.*
var. violacea *Fab.*
var. Harrisii *n. var.*
patruela *Dej.*
var. consentanea *Dej.*
purpurea *Oliv.*
var. Audubonii *Lec.*
var. graminea *Schaupp.*
var. limbalis *Kl.*
var. spreta *Lec.*
var. transversa *n. var.*
var. lauta *Casey.*
var. denverensis *Casey.*
var. ludoviciana *n. var.*
var. plutonica *Casey.*
splendida *Hentz.*
var. amoena *Lec.*
cimarrona *Lec.*
decemnotata *Say.*
formosa *Say.*
var. generosa *Dej.*
var. manitoba *n. var.*

venusta *Lec.*
latesignata *Lec.*
fulgida *Say.*
echo *Casey.*
Willistoni *Lec.*
pseudosenilis *W. Horn.*
senilis *Horn.*
ancocisconensis *Harris.*
tenuicincta *Schaupp.*
vulgaris *Say.*
var. horiconensis *n. var.*
var. obliquata *Kirby.*
var. vibex *Horn.*
var. sierra *n. var.*
var. roguensis *Harris.*
repanda *Dej.*
var. unijuncta *Casey.*
duodecimguttata *Dej.*
eureka *Fall.*
oregona *Lec.*
var. maricopa *n. var.*
depressula *Casey.*
hirticollis *Say.*
var. gravida *Lec.*
var. ponderosa *Thoms.*
bellissima *n. sp.*
limbata *Say.*
var. hyperborea *Lec.*
tenuisignata *Lec.*
pusilla *Say.*
var. terricola *Say.*
var. cyanella *Lec.*
cinctipennis *Lec.*
var. imperfecta *Lec.*
lunalonga *Schaupp.*
var. tuolumnæ *n. var.*
rectilatera *Chaud.*
punctulata *Fab.*
var. micans *Fab.*
tortuosa *Dej.*
var. sigmoidea *Lec.*

dorsalis *Say.*
var. media *Lec.*
var. Sauleyi *Guér.*

hamata *Brullé.*
marginata *Fab.*
blanda *Dej.*
var. emprascens *Lec.*
var. puritana *Horn.*
Wapleri *Lec.*
nevadica *Lec.*
Knausii *n. sp.*
inquisitor *Casey.*
sperata *Lec.*

hirtilabris *Lec.*
gratiosa *Guér.*

lepida *Dej.*

togata *Laf.*
var. apicalis *W. Horn.*

Gabbii *Horn.*

pamphila *Lec.*

circumpicta *Laf.*
var. prætextata *Lec.*
var. californica *Men.*

severa *Laf.*
striga *Lec.*

lemniscata *Lec.*

viridisticta *Bates.*

hæmorrhagica *Lec.*
var. pacifica *Schaupp.*
rufiventris *Dej.*
var. cumatilis *Lec.*
var. Hentzii *Dej.*
var. 16-punctata *Klug.*
var. arizonæ *Wickham.*

marginipennis *Dej.*

Schauppii *Horn.*

abdominalis *Fab.*
var. scabrosa *Schaupp.*

politula *Lec.*

Sommeri *Mann.*

CICINDELIDÆ.

The general characters of the family have been so often treated that I simply repeat the short diagnosis of Prof. Schaupp.

"Antennæ filiform, 11-jointed, inserted on the front above the base "of the mandibles, which are long and sharply toothed; hind coxæ "mobile and simple; abdomen of female 6-articulate, of male usually "7-articulate."

The genera, following Major Casey's revival of *Dromochorus*, are separated thus:

Posterior coxæ separated, eyes small.
  Sides of elytra widely inflexed ....**Amblychila.**
  Sides of elytra narrowly inflexed.....**Omus.**
Posterior coxæ contiguous, eyes large, prominent.
  Third joint of maxillary palpi longer than the fourth .....**Tetracha.**
  Third joint of maxillary palpi shorter than the fourth.
    Legs and tarsi clothed throughout with fine decumbent hair.
      Dromochorus.
    Legs often hairy but not clothed throughout..... .....**Cicindela.**

AMBLYCHILA Say.

Contains one well-known species which occurs in Kansas and other southwestern States, and two other imperfectly known species which inhabit Arizona. These are:

A. cylindriformis Say, 1823, Jour. Ac. Phil., iii, p. 139; Thoms. Mon., p. 14, pl. 3, fig. 3; Lec., Col. of Kan., p. 1, pl. 2, fig. 1; Schaupp, Bull. Br. Ent. Soc., vi, p. 74, pl. 1, fig. 1; Rivers, Zoe, iv, p. 218, pl. 28; Horn, Trans. Am. Ent. Soc., v, p. 233 (sexual characters); *l. c.*, vii, p. 28 (larva).

A large brown or blackish insect, with paler brown elytra which are connate; head large, eyes small; the scarcely margined thorax and underside smooth; elytra oval with three carinæ on each and irregular, unequal punctures; legs long and robust, tarsi short; wingless.

♂.—Hind trochanters acute with two grooves; small but dense yellow brushes near the two tibial spurs of the middle legs; last ventral segment broadly rounded with large setigerous punctures each side of the middle; pygidium small.

♀.—Hind trochanters shorter, oval, obtuse at tip; last ventral segment somewhat prominent in middle and sinuate on each side with a feeble impression; pygidium very large.

Length, 30 to 38 mm. = 1.20 — 1.52 inch.

Habitat.—Clay bluffs southwest of and near Wallace, Kansas (most of the specimens now in collections were taken from this place), and other places in Wallace Co., Kan.; Gove Co., Kan.; Sun City, Barber Co., Kan.; Colo.; Ark.; Indian Terr.; New Mex.; Texas.

Habits.—Nocturnal, lives in holes made in clayey banks of ravines, especially those made by Kangaroo rats; moves in a peculiar manner, raising its body very high and keeping its antennæ in constant motion; sight very poor; prey consists of various insects, particularly larvæ of Orthoptera and Lepidoptera.

This insect must always be connected with the name of Prof. F. H. Snow of the University of Kansas. From the time of its description by Say until 1876 it was very rare; the Wallace County locality was then discovered by Williston and Brous, and in 1877 several hundred specimens were taken thence by Prof. Snow and distributed to various cabinets. Mr. Warren Knaus has since visited the locality and reports that about July 1st the insects, walking along the sides of the clay banks on warm, still evenings, may yet be found though no longer abundantly.

A. Piccolominii Reiche, 1839, Ann. Fr., p. 560, pl. 19, fig. 1–6, Rivers Zoe, iv, p. 218, pl. 29, differs mainly in being smoother and smaller. A specimen in Dr. Leconte's collection from Arizona, one in Mr. Hayward's collection and one taken by Mr. Rivers at Peach Springs, northwest Arizona, are the only individuals known to me. Dr. Leconte, Dr. Horn and Prof. Schaupp, regarded the differences presented by the first two specimens as insufficient for specific separation; but taking into consideration the wide difference in locality, which is important in the case of so slow moving a creature, and the later discovery by Mr. Rivers of still another individual, I am inclined to regard these specimens as indicating a distinct species inhabiting Arizona.

A. Baroni Rivers, 1890, Ent. Am. vi, p. 111; Zoe, iv, p. 218, pl. 29. The type was found dead in a canon in Pima Co., southern Arizona, at an elevation of 5000 feet, and Mr. Wickham mentions a specimen found by Dr. Edw. D. Peters, Jr., beneath a log lying in a damp spot in the Pinal Mountains, north of Tucson, Arizona, in June. I have had no opportunity of examining these insects, but from an examination of photographs sent to me, I should not hesitate to regard *Baroni* as a valid species. It is much smaller than *cylindriformis*, smoother between the carinæ, which are well marked, and apparently differs also in the long slender mandibles. I am not unaware that Mr. Rivers at one time regarded *Baroni* as the other sex of *Piccolominii*, but the differences in punctuation are too great to support this view, and the analogy of sexual differences in *cylindriformis* is directly opposed to it.

SYNOPSIS OF AMBLYCHILA.

Length, 30 mm. at least; color, brownish; surface of elytra, rugulose and irregularly punctate; apex of elytra, very coarsely punctured, elytra with three carinæ ..... **cylindriformis.**

Length, 28 mm.; color, deep black; surface of elytra, smooth and regularly punctate; apex of elytra, with punctures scarcely visible, elytra with three carinæ..... **Piccolominii.**

Length, 25 mm.; color, deep black; surface of elytra smooth and regularly punctate; apex of elytra, with punctures scarcely visible; elytra with one carina ..... **Baroni.**

OMUS Esch.

Contains several species which, except *Dejeani*, are very similar. All are confined to the Pacific Slope, ranging from Vancouver Island southward to Santa Barbara, Cal., and eastward as far as Montana. In habits nocturnal, these insects are said by Schaupp to be easily baited by placing finely chopped meat under pieces of board, where they may be found the following day. The sexes are separated by the anterior tarsi and last ventral segment, viz.:

♂.—Three joints of anterior tarsi dilated and spongy pubescent beneath; last ventral segment deeply emarginate at middle.

♀.—Anterior tarsi simple; last ventral segment oval at tip and entire.

The species of *Omus* divide readily into two groups, one containing a single species, *Dejeani*, distinguished by its large size and conspicuous foveæ; the other containing many species of similar size and appearance, all smaller than *Dejeani* and all without its conspicuous foveæ. They differ, however, in the sculpture of the thorax and elytra, in outline and in locality, each form being confined to its own particular territory. The differences in thoracic sculpture may be reduced to four principal forms, *i. e.*

Deeply wrinkled all over as in *californicus.*

Less deeply wrinkled all over as in *Lecontei.*

Wrinkled at the sides, less deeply within and with a space in the centre free from wrinkles as in *Audouinii.*

Smooth without wrinkles as in *lævis.*

The differences in elytral sculpture might be used to further subdivide, but have so far been used only in the case of *ambiguus* where the elytra are as smooth as in *lævis* though the thorax resembles *Audouinii.*

The differences in locality being difficult to appreciate without a

map of California, I have prepared a sketch map of the State from information furnished by Dr. Van Dyke to show the range of each species.

There are also differences in the form of the labrum, but I cannot satisfy myself that they indicate specific difference. Such differences are not accompanied by difference in distribution, and the labrum is subject to considerable individual variation not only in this genus but in *Cicindela*.

In *Dejeani* there is a marked failure of the side margin of the thorax to meet the basal margin and this character is repeated in some of the smaller species, *e. g.*, *Audouinii*, but it also is subject to individual variation.

The form of the thorax and elytra is exceedingly variable and on such characters the individuals now called *californicus*, for example, might be divided into a number of species. I have used this character very sparingly, and only when supported by geographical distribution. To collectors of *Omus* the general form, no doubt, becomes the most evident character, but it is more difficult for us in the East to appreciate and most difficult to describe successfully.

The species may be arranged according to their sculpture as follows, the inserted localities being approximate for the sake of brevity, and the exact localities being given under each species:

SYNOPSIS OF OMUS.

Elytra conspicuously foveate; very large. Vanc., Wash., Or. ..... **Dejeani.**
Elytra not foveate.
Thorax deeply wrinkled, highly polished. Coast Region near San Francisco. **californicus.**
Thorax less deeply wrinkled and more smooth, but without any smooth space at centre.
Larger, sides of thorax converging in nearly straight outlines to the base. Placer Co ..... **Edwardsii.**
Average size; sides of thorax less convergent and more arcuate in outline.
Form slender, widest before the middle and tapering thence to apex, labrum truncate. Southern Coast Range ..... **Lecontei.**
Form slender, widest at the middle; labrum bisinuate, advanced in the middle. Sierra of Mariposa Co ..... **intermedius.**
Form short and robust; labrum bisinuate, advanced in the middle. Southern Sierra ..... **sequoiarum.**
Thorax much smoother with a central space free from wrinkles.
Color, black as usual.
Elytra confusedly punctate, antennæ slender. Vanc., Wash., Or., No. Cal. **Audouinii.**

Elytra smoother, more distinctly punctate, antennæ stouter. Mt. Shasta Region ..... **ambiguus.**

Color, submetallic..... **submetallicus.**

Thorax entirely smooth without any wrinkles; elytra also dead smooth or feebly punctate; antennæ stout. Tulare Co..... **lævis.**

Each of these species is represented by numerous examples in different collections, except *ambiguus*, of which the type is in the collection of Mr. Charles Fuchs, of San Francisco, and *submetallicus*, of which the type is in the Horn collection now in the possession of the Academy of Natural Sciences of Philadelphia. These two species live in a rather inaccessible region in northeast California which has not been recently collected. One other species, *lævis*, has been regarded as rare, but recently numerous examples have been found, some of which differ from the type in being more punctate on the elytra but, as these were associated in nature with examples which exactly duplicated the Horn type, they are for the present regarded as *lævis*.

Specimens of *sequoiarum* in Dr. Van Dyke's collection demonstrate that *Hornii*, separated because of its almost quadrate thorax, is only a variety. The form of the thorax is especially variable in this genus, and *Hornii* is simply the extreme form of *sequoiarum*, in which the thorax is always rather broad.

Of the species described by Major Casey four are described from one or two specimens only, and in some instances, I think, he has been misled by the strong individuality so many specimens present.

O. montanus Casey, I regard as a variety of *Edwardsii* separated by the labrum being more deeply bisinuate, the median lobe more prominent, with its apex transversely truncate. This difference is to be observed in many specimens now labeled *Edwardsii*, and is associated with narrower elytra which are more elongate and more parallel. It occurs in Placer County where *Edwardsii* also is found, perhaps at a lower elevation.

O. sculptilis Casey, I regard as a variety of *californicus* separated by the form of the labrum which is nearly truncate, the median lobe very feeble and broadly rounded. The sculpture of the thorax is described as being similar to that of *californicus*. It was taken in the coast region north of San Francisco.

O. elongatus Casey, I regard as a variety of *Lecontei* separated by the labrum being bisinuate instead of truncate. The type was

found near San Francisco. It will be noted that *californicus* extends into the northern part of Monterey County where *Lecontei* also occurs and that, while typical specimens of these two species are readily separated, it is most natural that an intermediate form should occur.

O. lugubris Casey, I regard as a synonym of *Edwardsii*. The following is taken from the paper by Major Casey (Ann. N. Y. Acad. Sci., ix, pp. 288, etc.):

"Lateral margin of the prothorax distinctly reflexed, imperfectly attaining the "base, the sides almost straight and strongly convergent from apex to "base nearly as in *Dejeani*.
"Labrum bisinuate at apex, the median lobe broadly rounded and moderately "advanced ..... **Edwardsii.**
"Labrum more deeply bisinuate, the median lobe more prominent, with its apex "transversely truncate; elytra narrower, more elongate and more "parallel ..... **montanus**
"Lateral margin fine and but slightly reflexed, the marginal bead not attaining the "base; sides distinctly convergent from the apex and almost straight.
"Labrum bisinuate, the median lobe more prominent than the sides, advanced "lobe truncate, body rather stout, 17.5 mm. long" ..... **lugubris.**

"Two males from California without accurate indication of locality." The characters used are all subject to individual variation in *Edwardsii* and do not indicate even a variety.

O. punctifrons Casey and *confluens* Casey, each described from a single female from an unrecorded part of California, I regard as synonyms of *sequoiarum*. The thorax "feebly vermiculato-rugose" makes them either *Edwardsii*, *Lecontei* or *sequoiarum*. The sides "evenly arcuate," and the size make them not *Edwardsii;* the elytra "widest at middle," make them not *Lecontei*. The "labrum bisinuate, the median lobe moderately advanced and truncate;" the "median parts of the front sparsely or finely punctate;" the form "moderately ventricose" and "rather stout and feebly convex," are all characters that exactly fit *sequoiarum*. Major Casey gives their differences as follows:

"Labrum bisinuate, the median lobe more prominent than the sides.
"Elytral punctures separated through the greater part of the surface.
punctifrons.
"Elytral punctures close-set and confluent nearly throughout ... **confluens.**
"Labrum deeply bisinuate, the median lobe more advanced" .. **sequoiarum.**

In making these quotations, I should say that some characters are copied from the descriptions and others from the synoptic table, the latter being mainly co.ied.

I have tried to find a general character that would serve to separate the species inhabiting the Sierra Nevada from the coast species without complete success. Usually, however, the stouter antennæ, first described by Crotch in *sequoiarum*, and the absence of wrinkles at the median part of the front, mentioned by Casey, characterize the Sierra species.

Apparently all the Californian *Omus* are related to *Audouinii* and the most northern species, *ambiguus*, is the closest to it; while the most southern representative of the genus, *lævis*, is the farthest removed from it. On account of the great similarity of the species, I have not written a complete description of each, but simply a brief summary of the characters by which each may be known.

SUMMARY OF CHARACTERISTICS.

O. Dejeani.—Elytra foveate; 15–21 mm.; lateral margins of thorax obliterated behind; thoracic margin reflexed; labrum deeply bisinuate; head wrinkled all over, impressions oblique; thorax wrinkled all over, widest behind the apex, arcuately convergent to base; elytra elliptical, punctate and foveate.

O. californicus.—Elytra not foveate; 14–17 mm.; thorax deeply wrinkled, highly polished; lateral margin of thorax fine and but slightly reflexed, attaining the basal margin; elytra moderately coarsely punctured; thorax narrowed behind; labrum bisinuate, the median lobe more prominent than the sides; sides of thorax feebly arcuate behind the middle, convergent from the apex; head wrinkled all over; elytra elliptical, widest at middle, antennæ slender.

O. sculptilis.—Same as preceding, except sides of thorax are strongly rounded behind the middle, labrum nearly truncate, the median lobe very feeble and broadly rounded.

O. Edwardsii.—Elytra not foveate; 14–18 mm.; thorax smoother and less deeply wrinkled, but without any smooth space at centre; sides of thorax converging in nearly straight lines to the base; lateral margin of thorax distinctly reflexed, obliterated behind; labrum bisinuate at apex, the median lobe broadly rounded and moderately advanced; head with the middle of the front sometimes free of wrinkles, simply punctate, or smooth; elytra oblong oval, sides feebly arcuate, widest at middle, antennæ stout.

O. montanus.—Same as preceding, but with still narrower elytra and different labrum: deeply bisinuate, the median lobe more prominent with its apex transversely truncate.

O. lugubris differs, if at all, by the less reflexed thoracic margin, labrum as in *montanus*, body rather stout.

O. Lecontei.—Elytra not foveate; the thorax smoother and less deeply wrinkled, but without any smooth space at centre; 15–16 mm.; sides of thorax

less convergent and feebly arcuate in outline; elytra widest before the middle and tapering thence to apex; lateral margin of thorax fine and but slightly reflexed, attaining the basal margin; labrum nearly truncate; head wrinkled all over; form slender; antennæ slender.

O. elongatus.—Same as preceding, except labrum deeply bisinuate, the median lobe more advanced.

O. sequoiarum.—Elytra not foveate; thorax smoother and less deeply wrinkled, but without any smooth space at centre; 14-18 mm.; sides of thorax arcuate in outline and slightly convergent towards base; thorax broader and stouter than usual; elytra widest at middle, broader, stouter, shorter, more convex than in other species; lateral margin of thorax fine and but slightly reflexed, attaining the base; labrum deeply bisinuate, the median lobe more advanced; head sometimes smooth or simply punctate for a small space at the middle of the front; antennæ stout.

O. Hornii.—Same as preceding but the thorax is still broader and nearly quadrate.

O. Audouinii.—Elytra not foveate; 13-18 mm.; thorax much smoother, with a central space free from wrinkles; color, black; elytra confusedly punctate; antennæ slender; lateral margin of thorax fine and but slightly reflexed, obliterated behind; sides of thorax nearly straight, convergent towards base; head sometimes punctate in the middle of the front; labrum transverse; elytra elliptical, widest at middle.

O. ambiguus differs by the stouter antennæ, and the smoother more regularly and distinctly punctate elytra.

O. submetallicus differs by the color and the elytra being broader posteriorly.

O. lævis.—Elytra not foveate; 14-18 mm.; thorax entirely smooth without any wrinkles; elytra smooth or punctate; antennæ stout; lateral margin of thorax fine and but slightly reflexed, attaining basal margin; elytra regularly oval in form; body rather stout; sides of thorax feebly arcuate in outline, convergent to base; head entirely smooth; labrum bisinuate.

I am not entirely satisfied that the forms with distinctly punctate elytra, which generally come from an elevation of 3000 to 6000 feet, should be united with the typical *lævis*, living at 9000 feet, and having impunctate elytra; but, as Dr. Van Dyke believes both forms occur together, and are simply forms, not races, I leave this species for further investigation in California.

O. intermedius n. sp.

Length, 17 mm. = .68 inch.

Moderately stout, deep black and shining. Head moderate in size, wrinkled all over except the middle of the front which is smooth and sparsely punctate, frontal impression feebly impressed; labrum bisinuate, the median lobe moder-

ately arcuately advanced; antennæ moderately stout, third and fourth joints constricted slightly at middle; thorax wrinkled all over but not deeply, median line very fine; the lateral margin fine and but slightly reflexed, attaining the base; sides of thorax feebly arcuate, moderately convergent to base; elytra elliptical, widest in front of the middle, moderately convex, closely not deeply punctate, towards apex confusedly punctate.

Habitat.—Mariposa Co., Cal. (Coulterville).

This species looks like *Lecontei*, but is smoother, and differs in the form of the labrum and in the sculpture of the head. It occurs, moreover, in the Sierra Nevada, while *Lecontei* is confined to the Southern Coast Range. Its nearest relative in the Sierra is *sequoiarum*, from which it differs by its more elongate form. It is probably in many collections under the name of *sequoiarum* and in some cases as *Lecontei*.

BIBLIOGRAPHY AND NOTES.

O. Dejeani Reiche, Ann. Fr., 1838, p. 299, pl. 10, fig. 1; Thoms. Mon., p. 16, pl. 3, fig. 7-8; Lec. P. R. R. Exp., 47 Par., pl. 1, fig. 1; H. Edwards, Psyche, vol. i, p. 73; Schaupp, *l. c.*, p. 76, pl. 1, fig. 2.

Length, 15 — 21 mm. = .60 — .84 inch.

Habitat.—Vancouver Island, Washington, Oregon, Northern California, Montana. April to July. Our largest species, easily distinguished by the irregular foveæ of the elytra. Sometimes obtained in numbers by breaking up rotten trunks of trees. Dr. Van Dyke tells me there is no recent record of the occurrence of this species in California.

O. Edwardsii Crotch, Trans. Am. Ent. Soc., 1876, v, p. 73; H. Edwards, *l. c.*; Schaupp, *l. c.*, p. 76, pl. 1, fig. 3; *lugubris* Casey, *l. c.*

Length, 14-18 mm. = .46 — .72 inch.

Habitat.—Near Lake Tahoe, Cal.; Placer Co., Sierra Co., Cal. June to August. Eastern Eldorado Co. (6000 feet); Eastern Placer Co. (4000 to 5000 feet); Placerville (3000 feet); Mokelumne Hill 2500 feet).

Schaupp compares this species with *Dejeani*, which it does resemble in being more depressed above than our other species and in being larger, but otherwise it is more likely to be confused with some of the following species. The nearly straight sides of the prothorax and the comparatively smooth surface seem to me its distinguishing characters.

Var. **montanus** Casey, Ann. N. Y. Acad. Sci., ix, 1897, p. 290.

Length, 15.5 — 18 mm. = .62 — .72 inch.

Habitat.—Placer Co., Cal. (of which Lake Tahoe is the western boundary).

Differs, according to the author, from *Edwardsii* in being narrower and more elongate, with less convex male elytra and in the form of the labrum, the median lobe being more prominent and truncate at apex. I consider this a variety of *Edwardsii*, the differences being actual but of insufficient force to warrant the recognition of another species in a genus already finely divided on feeble characters.

O. californicus Eschscoltz, Zool. Atl., 1829, i, p. 4, pl. 4, fig. 1; Thoms. *l. c.*, fig. 5–6; Lac. Gen. Atl., i, pl. 1, fig. 1; Lec. P. R. R., p. 27, pl. 1, fig. 3; H. Edwards, *l. c.*; Schaupp, *l. c.*, p. 76, pl. 1, fig. 7; var. *sculptilis* Casey, *l. c.*, p. 292.

Length, 14–17 mm.=.56–.68 inch.

Habitat.—California, west of Sierra Nevada, southward to Monterey County. January to May. Sonoma Co., Marin Co., San Francisco Co., San Mateo Co., Santa Cruz Co., Napa Co., Alameda Co., Contra Costa Co., Santaclara Co., North Monterey Co., up to 2000 feet.

This is the first described species, and is immediately distinguished from all the others by the deeply rugose or wrinkled prothorax. The series of specimens in my collection present many points of difference in the relative proportions of the thorax and of the elytra, and I expect careful collecting would enable resident students to separate distinguishable races inhabiting the various localities frequented by this species. One of these races, *sculptilis* Casey, differing in the rounded sides of the prothorax and feebly lobed labrum, has already been described from a single male taken in the coast regions north of San Francisco.

O. Lecontei Horn, 1872, Trans. Am. Ent. Soc., iv, p. 143; Schaupp, *l. c.*, vi, p. 77, pl, fig. 9.

Length, 15–16 mm.=.60–.64 inch.

Habitat.—Southern coast range of California. Monterey Co., San Benito Co., San Luis Obispo Co., Santa Barbara Co., and at Fort Tejon in western part of Kern Co. April to July.

This species is recognized by the form of the elytra, widest in front of the middle and tapering thence gradually to the apex. It meets *californicus* in the northern part of Monterey County, and is separated from it not only by the form of the elytra but by the less deeply wrinkled prothorax.

Var. **elongatus** Casey, *l. c.*, p. 293.
Length, 16.5–17.5 mm=.66–.70 inch.

Habitat.—Near San Francisco, California; collected by George W. Dunn.

Differs from the type in having the elytra evenly elliptical and widest at the middle, and from *californicus* in having the sides of prothorax strongly rounded behind the middle and the surface of the thorax less deeply wrinkled. It is an intermediate form, having some of the characters of each species, and is probably represented in all good Californian collections. Specimens from the Sierra Nevada should not be placed here.

O. sequoiarum Crotch, 1874, Trans. Am. Ent. Soc., v, p. 73; Schaupp, *l. c.*, p. 77, pl. 1, fig. 8; *punctifrons* Casey, *l. c.*, p. 291; *confluens* Casey, *l. c.*, p. 291.
Length, 14–18 mm.=.56–.72 inch.

Habitat—Calaveras Big Trees, Calaveras Co. (5000–6000 feet); Tuolumne Co., Mariposa Co., 10 miles north of Yosemite (5000–10,000 feet). The most southern locality is Crane Flats, overlooking the Yosemite valley. Another form is found in Sierra Co., Nevada Co., Plumas Co. and Placer Co. (Forest Hill), at elevations of 2700–3500 feet.

This species is broader and stouter; the labrum is produced in front instead of being transversely truncate or convex; the thorax is wrinkled all over, but not as deeply as in *californicus;* the median part of the head in front is for a little space without wrinkles and more or less punctate. It varies considerably in outline and it would be possible to divide it into several varieties.

Var. **Hornii** Lec., 1876, Trans. Am. Ent. Soc., v, p. 157; H. Edwards, *l. c.*; Schaupp, *l. c.*, p. 76, pl. 1, fig. 6.
Length, 16.5 mm.=.66 inch.

Habitat.—Yosemite, California; 3700 feet. June.

Very broad, thorax less narrowed behind, almost quadrate; elytra broadly ovate, much rounded on the sides. An extreme form of *sequoiarum.*

O. Audouini Reiche, Ann. Fr., 1838, p. 300, pl. 10, fig. 2; Thoms. Mon., p. 16, pl. 3, fig. 7–8; Lec. *l. c.*, p. 27, pl. 1, fig. 2; H. Edwards, *l. c.*; Schaupp, *l. c.*, p. 76, pl. 1, fig. 4.
Length, 13–18 mm.=.52–.72 inch.

Habitat.—Foot hills and mountains of California, Oregon, Wash-

ington and Vancouver. Trinity Mountains of Trinity County, Cal. (3000 feet). June to August.

The distinguishing features of this species are less deeply wrinkled thorax, smooth at middle and the more unequal punctures of the elytra. The disk and apical margin of the thorax are nearly smooth and not wrinkled. Covering a wide range of terrritory this species presents many variations which have not received names.

O. ambiguus Schaupp, 1883, Bull. Br. Ent. Soc., vi, p. 121.
Length 16 mm. = .64 inch.

Habitat.—Mount Shasta district, California; probably Upper Soda Springs, Siskiyou County (3000–4000 feet).

As many readers may not have the Bulletin in which the description of this species occurs, I copy here Schaupp's words: "This species resembles *Lecontei* Horn and *Audouini* Reiche; it belongs to my second group, the lateral margin of the thorax attaining the basal margin; from *Lecontei* it differs by the shape of the elytra, agreeing therein with that of *Audouini*, by the bisinuate labrum, by the much deeper frontal impressions, by the smoother thorax, with hind angles more prominent, by the elytra more irregularly confusedly punctured, and smoother near the middle; from a large specimen of *Audouini* it differs by lateral margin of the thorax united to the basal, by much smoother and less confluently punctured elytra and by the markedly stouter antennæ."

One specimen, now in the collection of Charles Fuchs, is the only representative. I owe an opportunity of examining this specimen to the kindness of Mr. Fuchs and add to the description:

Head wrinkled in front and between the eyes, wrinkles becoming obsolete at the back of the head; impressions oblique and broad; labrum bisinuate, the median lobe arcuately moderately advanced; antennæ more than half as long as the body, rather stout but not more stout than in *lævis*, third and fourth joints feebly constricted; prothorax rounded broadly behind the apex and converging arcuately to the base; the side margin attaining the basal margin; the surface is feebly wrinkled at the sides, more plainly at the apex and across the base; the central portion is, however, broadly smooth, the wrinkles entirely effaced; elytra elliptical, broadest at middle, strongly punctate throughout, punctures partly confluent at apex.

This species seems to me very close to *Audouini*, differing mainly in the stout antennæ by which it leads towards *lævis* and other Sierra Nevada forms, but especially towards *lævis* on account of its smoother sculpture.

O. submetallicus Horn, 1868, Trans. Am. Ent. Soc., ii, p. 129; H. Edwards, *l. c.*; Schaupp, *l. c.*, p. 76, pl. 1, fig. 5.

Length 13.5 mm. = .54 inch.

Habitat.—Mountains near Alleghany City, Sierra Co., Cal. (4000–5000 feet). September.

Differs from all the other species by its bronze color. The form is elongate, nearly parallel and cylindrical, the elytra broadest near the apex. Mr. Fuchs writes me, "the type was found by James Behrens (*fide* Behrens), not by Henry Edwards," and the locality and season were as above stated.

O. laevis Horn, 1866, Proc. Ac. Nat. Sci. p. 394; Schaupp, *l. c.*, p. 77, pl. 1, fig. 10.

Length 14–18 mm. = .56–.72 inch.

Habitat.—Tuolumne Meadows, Tuolumne Co. (9000 feet); Fresno Co., Tulare Co. (3000–5000 feet). Type was found in the High Sierra near the head waters of King's and Tule Rivers. June.

Differs from all the other species in being almost entirely smooth and subopaque; the elytra are regularly oval, exhibiting a few almost obsolete punctures in the type, but evidently punctate in most of the other specimens I have seen.

TETRACHA Hope.

Large metallic green species, which hide during the day and hunt at night. They are found southward from Philadelphia in all the States from the Atlantic to the Pacific. Head large, with large circular eyes; thorax broader than long; elytra subparallel, slightly convex, deeply punctate.

♂.—Anterior tarsi dilated; last ventral segment triangularly emarginate; tip of elytra subtruncate; sutural angle rectangular.

♀.—Anterior tarsi simple; last ventral segment broadly oval at tip; tip of each elytron rounded; sutural angle obliterated.

T. carolina Linn., Syst. Nat., 1735, ii, p. 567; Dej. Spec., i, p. 8; Thoms., *l. c.*, p. 30; Horn, Trans. Am. Ent. Soc., v, p. 234 (sexual characters); *l. c.*, vii, p. 34 (larva); Schaupp, *l. c.*, p. 78, pl. 1, fig. 11.

Length 20 mm. = .80 inch.

Habitat.—Ga.; Fla.; La.; Tex.; Lower Cal.; N. Mex.; Ariz. July and August.

Light gold green, tip of abdomen, apical lunule of elytra, legs and antennæ luteous; thorax smooth; elytra coarsely punctate, at the middle purple and at the margin bright green.

T. virginica Linn., Syst. Nat., 1735, ii, p. 567; Thoms., *l. c.*, p. 41, pl. 7, fig. 7; *virginata* Linn., Syst. Nat. (Gmelin), i, iv., p. 1922; Schaupp, *l. c.*, p. 78, pl. 1, fig. 12.
Length 20–24 mm. = .80–.96 inch.

Habitat.—Pa.; Fla.; La.; Tex.; Neb.; Kan.; Tenn.; Va.; S. C. August.

Dark gold green, last ventral segment and antennæ ferrugineous; thorax smooth; punctuation of elytra coarser than in preceding; broad lateral margin of thorax and elytra metallic green, middle black, no apical lunule.

DROMOCHORUS Guér.

This genus differs from *Cicindela* in general appearance and in the legs and tarsi being clothed with fine decumbent hairs. The body is wingless with rounded humeri. Casey is too broad in stating that the black labrum has a rounded pale spot at middle as this spot is often wanting.

♂.—Three joints of anterior tarsi dilated with short silky pubescence beneath; last ventral segment broadly emarginate; middle tibiæ glabrous.

♀.—Anterior tarsi slender; last ventral segment longer than in the male, slightly compressed at the sides, posterior half with a longitudinal impression varying in depth; middle tibiæ glabrous.

From Mr. F. F. Crevecoeur, of Onaga, Kan., I learn that *D. Belfragei*, and presumably the other species, occur in July and August, and are probably crepuscular in habit, as he never found them except between eight and ten in the morning and after six at night, and even then they were in the weeds by the roadside and were dislodged by walking through them.

D. Belfragei Salle, Ann. Fr., 1877, Bull., p. 6; *sericeus* Casey, 1897, Ann. N. Y. Acad. Sci., ix, p. 294; *pruininus* Casey, *l. c.*, p. 294.
Length 11.5–15 mm. = .46–.60 inch.

Habitat.—Kansas and Texas. Onaga, Kan., Mr. Crevecoeur. Salina, Kan., Mr. A. W. Jones.

Humeral angles rounded, black above and beneath, in fresh specimens with a rich violaceous reflection above. Head large, eyes only moderately prominent, interocular striæ feeble, labrum very large, black, often with a white spot which is not sexual; with three teeth in front; thorax cylindrical, slightly longer than wide, flanks sparsely clothed with decumbent hairs; elytra elliptical, smooth or feebly punc-

tate, sometimes with a faint series of punctiform non-metallic foveolæ near the suture.

There is so much variation in the large series I have received from Mr. Crevecoeur in the punctuation and color of the elytra, which variations are duplicated in other Cicindelidæ, that I cannot recognize *sericeus* and *pruininus* as anything but synonyms. The Kansas specimens are entirely without the row of foveæ which begin to appear in Texas specimens thus leading on to the next species.

D. Pilatei Guérin, 1845, Ann. Fr. Bull., p. 96; Mag. Zool., 1845, pl. 162; *maga* Lec. Trans. Am. Ent. Soc., 1875, v, p. 161; Schaupp, *l. c.*, p. 85, pl. 1, fig. 13.

Length 12–15 mm. = .48–.60 inch.

Habitat.—Louisiana, north shore of Lake Pontchartrain.

Resembles the preceding and differs in having a series of green punctiform foveæ in a row near the suture, and a few dispersed over the elytra and in having the head and, to a less degree, the thorax greenish. This species is apparently confined to the locality stated above and is rare in collections where *Belfragei* is often placed under this name. The late Mr. Hugo Soltau collected it at Covington, La., in woods on the north shore of the lake by using a lantern.

CICINDELA Linn.

The species of this genus usually live in sunny places, either sandy roads and fields, ocean shores, lake shores, river banks, mud flats, hiding during the night and on rainy or cloudy days in holes dug in the sand, or under bark, stones, dried mud or similar situations. They present a very uniform appearance, the most obvious differences being in size and color. The head is large and the eyes prominent. The thorax varies from cylindrical to a flattened trapezoidal form. The elytra are usually quite convex and subparallel at the sides, while the tips may be rounded or in one group emarginate. The legs are always long and slender. The minor structural characters used in separating the species are drawn from the labrum, the interocular striæ of the head, the thorax and the elytral tip; the pilosity of the body and the punctuation of the elytra are also used.

The labrum may be either prolonged or short, glabrous or hairy, dentate or simply sinuate in front. When dentate the number of teeth varies from one to three, the teeth vary in position and in magnitude. The figures show the form of the labrum in several

species. The labrum is subject to some individual variation and is not always easy to see, and I have not used this character unnecessarily; but evidently a marked difference in this character indicates specific difference.

The interocular striæ do not present many differences; they are usually numerous and fine and nearly fill the space between the eyes; sometimes they are very faint; sometimes they are few and coarse. In those species which have the front glabrous, these striæ are usually prolonged almost to the labrum.

The thorax is usually narrower at base than at apex; when this is well marked it is called trapezoidal; when feebly marked or absent, it is called quadrate or subquadrate; usually the line of demarkation between the dorsal aspect and the flanks is evident, when it is not so the thorax is called cylindrical. The thorax is usually more or less flattened above, and when this is not especially evident, it is called convex. Always three grooves interrupt the upper surface, the anterior and basal which parallel respectively the anterior and basal margins, and the median which runs directly through the median line of the thorax; but these grooves vary greatly in depth.

The elytra are more or less flattened, when this is not marked, they are called convex. In the *celeripes* group they are rounded at the humeri, but otherwise the angle is always distinct; the apices are usually conjointly rounded, sometimes minutely serrulate, sometimes plain. In *repanda* and *Sommeri* the serrations are especially evident. In some groups there is a considerable sexual modification of the elytral apex, whereby a piece is cut out of the external margin and a subapical angle is produced. The surface of the elytra is usually even, but a subhumeral depression at the base is more or less evident.

The outline of the elytra varies, as I have tried to show in the figures.

The pilosity of the body is quite variable and will be specially mentioned under each species. The hairs on the front between the eyes are especially useful.

The punctuation, especially of the elytra, is very useful and seems constant.

"Impunctate" is the term applied to the *scutellaris* group, although in some southern races a fine punctulation is visible. "Simply punctate" means without elevated granules beside each puncture. "Granu-

late-punctate" means that the surface is roughened with raised points as well as with depressed punctures. "Semi punctate" refers to the form found in *pulchra* where merely the anterior half is punctate. In addition to the punctures some species have some foveæ usually green at base.

The sexes in *Cicindela* may be known as follows:

♂.—Three joints of anterior tarsi dilated, with short silky pubescence beneath; last ventral segment broadly emarginate; middle tibiæ pubescent on the outer side.

♀.—Anterior tarsi slender; last ventral longer than in the male, slightly compressed at the sides, posterior half with a longitudinal impression varying in depth; middle tibiæ glabrous.

These differences apply to all the species; in some groups the mandibles, the labrum, the thorax and the elytra are sexually modified, and these will be noted in dealing with each group.

In arranging the forms before me, I have regarded as species those forms which differed notably in structural characters, and as races or varieties those in which differences in color or marking accompanied a difference in geographical distribution. In some cases where a color difference has already received a name I have preserved it, believing that less confusion will result from such preservation than by the suppression of a name which may not be strictly justified.

Markings.—In describing these I have followed Schaupp's phraseology, viz.: apical lunule, middle band, humeral lunule, for the complete markings; basal dot, humeral dot, post humeral dot, marginal dot, submarginal or supplementary dot, subapical dot, apical dot, for the completely broken markings.

Hibernation.—Before proceeding with the description of the species, I have to speak of the dates at which the Cicindelidæ appear in this neighborhood. Mr. Wm. T. Davis and I find *repanda* on the first warm sunny days in Spring; we find other species also in April, and all of these early appearing species continue with us until midsummer when they disappear, and for two months (July and August) are either entirely missing or very scarce. In September they reappear and remain with us until late in the Fall. Other species, *dorsalis*, for example, can be found only in July and August. These facts have led us to speak of the first named species as "double-brooded," and the midsummer *dorsalis* as "single-brooded." But Mr. Wenzel

has written me of catching Cicindelidæ in a railroad cut so early in the season that the snow still lay on one side the track; and on reflection it appeared that our captures were made too early for the larvæ to have had any opportunity of feeding; and it, therefore, seemed probable that the Fall Cicindelidæ lived over Winter buried in the sand to emerge in the warm days of Spring. To ascertain if they were capable of hibernating, Mr. Davis brought home, on October 19th, several specimens alive and gave them a large glass jar with sandy bottom. Left to themselves in a cold barn they promptly buried in the sand provided. In December, one was taken out and proved to be alive and well. In January the jar was brought into a warm room and the beetles were apparently dead, but, after about four hours of warmth, one of them woke up and ran about, and the following morning another had followed his example. These two were then placed in a large fern case where they could find hiding places and where one was observed on March 27th, still alive. There appears, therefore, to be no good reason for considering any of the species double-brooded.

Odor.—Dr. Leconte says of *sexguttata*, "exhales a fragrant odor;" Mr. Oslar writes me of *Oslari*, "it emitted when handled a strong musky odor;" and Mr. Davis has noticed an apple-like odor in *punctulata*, especially when captured at electric lights.

Microscopic Structure of Elytra.—The sculpture of the elytra is, in many species, very elaborate. There are numerous rather coarse punctures, visible to the naked eye, which in the granulate-punctate species are as if formed by a sharp instrument directed forward so as to cause an elevation or granule in front of each puncture. The depression caused by each puncture may be the same color as the surface of the elytra or a different color, and the changeable color of some species is due to the different positions in which it is held making more or less of the depression visible. In addition to the visible punctuation the surface of the elytra and the depressions are closely covered with a minute punctulation, visible only under the microscope, much finer than the granulation of the eyes. These minute punctulations are metallic green-blue and cupreous, and in *repanda*, for example, make a brilliant show when sufficiently magnified.

In the maculate species the punctures cease, or nearly cease, within the maculation, which is visible on the other side of the elytron when it is detached from the beetle.

SYNOPSIS OF CICINDELA.

Humeral angles distinct; winged species..... A.
Humeral angles rounded; wings aborted.....**celeripes** group.
A. Abdomen not red.....B.
Abdomen red.....C.
B. Thorax margined or almost margined.....BB.
Thorax not margined.....D.
BB. Abdomen sparsely clothed with decumbent hair, surface above sericeous, not hairy beneath.....**obsoleta.**
Sides beneath sparsely clothed with erect hair, surface sericeous shining.
nigrocœrulea.
Abdomen not hairy, elytra flat, foveate.....**unipunctata.**
Abdomen sparsely hairy, front excavated, thorax hairy beneath, elytra with a vague depression at basal third.....**longilabris** group.
Abdomen not hairy, elytra convex with depression at basal third and vague longitudinal depressions almost continuous.
Immaculate, green bronze.....**robusta.**
Green bronze with broad white margin.....**Bowditchi.**
D. Pubescence beneath erect or lacking.....E.
Pubescence beneath decumbent.....F.
E. Anterior tarsi ♂ more broadly dilated.....G.
Anterior tarsi ♂ narrowly dilated.....H.
G. Labrum well developed, either advanced in the middle, or evidently tridentate, or both.....I.
Labrum feebly developed, either obsoletely tridentate or feebly unidentate or not plainly dentate at all.....J.

(The divisions of section E are not strongly defined and the species towards the end of each group approach the characters of the next. I have placed *latesignata* in both I and J).

I. Elytra impunctate.....**scutellaris.**
Elytra strongly punctate at base, punctures becoming more feeble behind the middle, obsolete at apex.
Front hairy; thorax smooth; hairy beneath; elytra not serrulate at apex
pulchra.
Front hairy; thorax slightly rugose; hairy beneath; elytra serrulate at apex.....**pimeriana.**
Front bald; thorax slightly wrinkled at sides; bald beneath; elytra not serrulate at apex.....**Hornii.**
Elytra granulate punctate; palpi black in both sexes.
Front not hairy.
Not hairy beneath.....**sexguttata.**
Hairy beneath.....**patruela.**
Front hairy; hairy beneath.....**purpurea** group.
Elytra less granulate, punctate; palpi ♂ pale at base; front and beneath very hairy.
Punctuation feeble, apex not serrulate.....**formosa** group.
Punctuation stronger, apex serrulate.....**latesignata.**
Elytra sericeous, size very small.....**viridisticta.**

J. Elytra serrulate at apex.
Front hairy; elytra dull, punctuation feeble, markings broad, often confluent ..... **latesignata.**
Front hairy; elytra shining, punctuation stronger, markings broad, not confluent ..... **fulgida.**
Front bald; elytra dull, punctuation stronger, markings broad, usually not confluent ..... **Willistoni** group
Front hairy; elytra dull, punctuation more feeble, markings slender, pattern like *repanda* ..... **ancociseonensis.**
Elytra not serrulate.
Front hairy.
Elytral markings connected at margin ..... **tenuicincta.**
Elytra markings not connected.
Humeral lunule obliquely prolonged ..... **vulgaris.**
Middle band arcuately ascending ..... **senilis.**
Front not hairy ..... **bellissima.**
H. Elytra not sericeous.
Abdomen not glabrous.
Elytra serrulate at apex.
Markings normal ..... **repanda** group.
Elytra largely white, body very hairy ..... **limbata.**
Markings of large dots ..... **rectilatera.**
Middle band unusually prolonged ..... **tennisignata.**
Middle band very irregular, tortuous like an irregular S.. **tortuosa.**
Elytra not serrulate at apex ..... **depressula.**
Abdomen nearly glabrous ..... **punctulata.**
Elytra sericeous ..... **pusilla** group.
F. Elytra ♀ angulated; thorax widest behind ..... **dorsalis** group.
Elytra ♀ not angulated.
Head beneath the eyes pubescent.
Elytra ♀ emarginate externally at the apex.
Right mandible ♂ toothed ..... **hamata** group.
Elytra with a basal dot ..... **cupraseens** group.
Elytra without basal dot ..... **sperata** group.
Labrum very long, elytra with broad white margin.
hirtilabris group.
Elytra in great part white.
Legs and sutural margin pale ..... **lepida.**
Elytra ♂ acuminate ..... **togata.**
Elytra ♂ prolonged ..... **pamphila.**
Head beneath the eyes not pubescent; thorax pubescent beneath.
Elytra ♀ separately rounded.
Middle band abnormal (see figure) ..... **Gabbii.**
Front finely striate ..... **circumpicta.**
Front deeply, coarsely striate.
Thorax almost smooth ..... **severa.**
Thorax transversely strigose ..... **striga.**
Head and thorax glabrous beneath, sides of abdomen densely clothed with decumbent hair ..... **lemniscata.**

B. Normal markings..... **haemorrhagica** group.
Marginal band..... **marginipennis.**
Marginal band and middle band..... **Schauppii.**
Black shining, apical lunule and faint dots..... **abdominalis.**
Black bronzed shining, apical lunule barely indicated..... **politula.**
Black with broad luteous markings..... **Sommeri.**

CELERIPES group.

C. celeripes Lec., Ann. Lyc., 1848, iv, p. 183, pl. 14, fig. 14; Schaupp, *l. c.*, pp. 85, pl. 1, fig. 14.
Length 6-8.5 mm = .24-.34 inch.

Habitat.—Ill.; Neb.; Kan.; Dak.; Ark.; Ia.

Brown-bronze, head and thorax greenish; underside and legs green; tibiæ and palpi pale, head granulate-rugose, eyes very large, labrum large with one tooth; thorax long, cylindrical, grooves faintly impressed; elytra coarsely punctate, punctures green at base, sparsely clothed with short hair; elytral markings variable, usually a discoidal dot representing the tip of humeral lunule, another dot to represent tip of middle band, a marginal line at the middle and an apical lunule. In some specimens the last only is present. Interocular striæ fine and numerous; trochanters pale; elytra broadest behind the middle and broader in ♀ than ♂, suture terminating in a small spine more prominent in ♂.

This species cannot fly and resembles a large ant when running. It was taken abundantly by Prof. Popenoe in Riley Co., Kansas, on open prairie land, dry sandy loam, covered with short cropped grass; also by Prof. Wickham on the high clay hills back of Council Bluffs, Iowa, in June and July, 1897, at noonday. The insects seemed to make instinctively for the cover of the scattered grass clumps. Prof. Bruner has sent me specimens taken in Nebraska, but I am not advised of the exact locality.

C. cursitans Lec., 1856, Trans. Am. Phil. Soc., xi, p. 60.
Length 7.5-8.5 mm.=.30-.34 inch.

Habitat.—La.; Ark.; Neb.; Ill.

Closely resembles the preceding; differs in having the elytra less deeply punctured and the sutural spine less prominent. The elytral markings are broader than in *celeripes* and are confluent with the broad marginal line which may reach only the apical two-thirds of the elytra.

Prof. Wickham mentions this species having been taken at Covington, La., by the late Hugo Soltau. He found it in abundance on yellow sand in open timber a little way from the banks of a small stream.

OBSOLETA group.

C. obsoleta Say, 1823, Jour. Ac. Phil. iii, p. 143; Lec., Ann. Lyc., iv, p. 178, pl. 13, fig. 4; Schaupp, *l. c.*, p. 86, pl. 1, fig. 15.
Length 16–20 mm. = .64–.80 inch.

Habitat.—Tex.; Ark.; N. Mex.; Ariz.; Kan.; La.; Cal.

Very large, sericeous, variable in color. Above the hairs consist of short fringe on either side of the thorax; beneath, the palpi, the flanks of the thorax, the sides of the abdomen and the femora are sparsely clothed. The interocular striæ are very faint. Based on color and markings the following have been described:

Black, immaculate, more slender.....**obsoleta.**
Green, immaculate, more slender.....var. **prasina.**
Black, maculate, broader.....**vulturina.**
Green, maculate, broader.....var. **Santaclaræ.**

The localities given above apply to all the forms included in this group, which are sometimes confused in collections making the distribution at present uncertain.

Var. **prasina** Lec., Ann. Lyc., iv, p. 178; Schaupp, *l. c.*, p. 86, pl. 1, fig. 16.

In addition to *prasina*, which is the green form of *obsoleta*, there are unnamed color varieties in which the color is dark blue, and others in which it is coppery, but these appear to be unusual forms.

C. vulturina Lec., Proc. Ac. Phil., vi, p. 439; Schaupp, *l. c.*, p. 86, pl. 1, fig. 17; pl. v, fig. 125.

The markings in this species, when most complete, consist of slender humeral lunule, middle band starting from the margin with a slight upward inclination and bent at nearly a right angle, an apical lunule rectangularly bent at its upper extremity, and a fine marginal line connecting all the markings; but every mark may be broken or almost wanting and the transition to the *obsoleta* form is easily traced as far as markings go, yet the typical broad form of *vulturina* is preserved.

Prof. Wickham has described the habits of this insect in "Societas Entomologica," September, 1900, when taken at Alpine, Tex., during June and July, chiefly on broad flats of bottom land used as pasture. It lurks in dry spots to leeward of some clump of bunch grass; readily

alarmed, it rises quickly for a long sustained flight high above the ground. One took three flights in trying to escape, aggregating 420 yards. Owing to its size and rapidity it is a formidable foe to other insects. Black and green forms, maculate and almost immaculate, were intermingled. In Meade Co., Kansas, Prof. Popenoe has taken this species on roads and prairies, preferring bare ground, but not shunning short growth of vegetation.

Var. **Santaclaræ** Bates, 1890, Trans. Ent. Soc., London, p. 493.

This variety, described from Mexico, is simply a green form of *vulturina*.

UNIPUNCTATA group.

C. unipunctata Fab., 1775, Syst. Ent., p. 225; Oliv. Ent., ii, 33, p. 23, pl. 4, fig. 27; Say, Trans. Am. Phil. Soc., i, new ser., t. 13; Say (Lec. Ed.), ii, 425 and 522; Schaupp, p. 86, pl. 1, fig. 18.

Length 16 to 18 mm. = .64-.72 inch.

Habitat.—N. Y.; N. J.; Pa.; Ga.; Mo.; Ia.; Ky.; N. C. May, June, July and August.

Brown, opaque, sericeous, beneath dark blue; elytra flattened to an unusual extent, uneven by irregular depressions, with closely placed green punctures and dispersed green foveolæ. The markings consist of a marginal triangular white spot on each elytron. This species is nearly without the white hairs; above a feeble fringe on each side the thorax and beneath a few hairs on the femora and the palpi are all that are visible. The middle tibiæ of the ♂ have the usual hairs.

This species shuns the sunny situations frequented by the other species. It frequents roads through the woods, and instead of flying when alarmed it frequently creeps under leaves and stones. Mr. Nathan Reist finds it near York Furnace, Pa., Mr. George A. Ehrmann finds it at Brown's Woods, near Pittsburg, Pa., Mr. Frederick Blanchard found it in Western N. C., Prof. Wickham found it once in Cedar Co., Iowa, Mr. H. W. Wenzel finds it in New Jersey, Mr. Charles Dury found it in the woods of Carter Co., Ky., and all give a similar account of its habits.

LONGILABRIS group.

C. longilabris Say, 1824, Long's Exp. App., p. 268; Lec. Ed., i, p. 176; *albilabris* Ky., Fn. Bor. Am. iv, 12, pl. 1; Schaupp, *l. c.*, p. 86, pl. 1, fig. 19.

Length 13-17 mm = .52-68 inch.

Habitat.—(Including all varieties) Hudson's Bay; Canada; Yukon; Wisconsin; Nova Scotia; Newfoundland; White Mountains; Maine; Montana; Idaho; Colorado; Utah; California; Wyoming; Lake Superior; Quebec; Alberta; Manitoba; Michigan; extending across the continent in Canada, and descending in the United States as far south as Colorado in the mountains.

Black, brown or green, maculate or immaculate, abdomen always green, except in very dark specimens from Utah and in var. *montana;* head bald in front, broadly excavated between and above the eyes, by which character this species may be identified; interocular striæ fine and numerous; labrum very long, especially in the male, feebly toothed (Schaupp says three toothed, but I can find only one in many specimens); thorax trapezoidal, short, almost margined, rugose, deeply impressed; elytra depressed near suture at basal fourth and depressed shortly before the apex, granulate-punctate, near the suture a row of faint large foveolæ which are often missing especially in the varieties. Pilosity above consists of a few upright setæ at the sides of the thorax, on the scape of the antennæ and beside the eyes; beneath distant erect hairs appear on the flanks of the prothorax, the mouth parts and a few on the abdomen, but the insect is not especially hairy.

The markings of this species consist normally of humeral and posthumeral dots, middle band entering perpendicularly from the margin and bent at an obtuse angle, and a subapical dot. They vary in one direction so that not even the faint middle band remains, and in the other direction so that the humeral and apical lunule are not only complete, but quite heavy and even connected at the margin. The variations in color and marking are to some extent associated with geographical distribution and indicate a number of genuine races. These may be separated as follows:

Elytra more slender and convex, without depression at basal third, vivid green above, markings broad and distinct ..... **perviridis.**

Elytra more flattened with depression at basal third. **longilabris** and varieties.

Usually green beneath, rarely almost black.

Black or dark brown, not heavily marked ..... **longilabris.**

Bronze above, usually heavily marked ..... **Laurentii.**

Coppery bronze above, feebly marked } ..... **Oslari.**
Bottle green above, feebly marked }

Green or bronze, shining, immaculate ..... **vestalia.**

Black beneath ..... **montana.**

Var. **Laurentii.** Schaupp, *l. c.*, p. 87.

Occurs in Colorado.

Dark brown, slightly bronzed, beneath blue green; the humeral lunule entire, sometimes connected with the middle band by a narrow submarginal white line, middle band more prominent than in typical *longilabris*, apical lunule entire and dilated anteriorly into a conspicuously elongated spot. In a large series sent me by Mr. E. J. Oslar from South Park, Colorado, the Schaupp description holds good in nearly all the specimens, though the color is brighter than his type and the submarginal band occasionally disappears. I have specimens also from Golden, Colorado, both stations being in the Rocky Mountains. Mr. Edw. D. Harris has a specimen from Silver Plume County, that is quite green.

Var. **Oslari** n. var.—Form nearly as in *longilabris*, but more depressed; above and beneath coppery bronze, except the abdomen which is brilliant green, and the white labrum and mandibles which are partly white; or green throughout, except the legs, tinged with bronze, and the white labrum. Elytral markings a posthumeral dot, a middle band and a subapical dot; rarely there is a humeral dot and still more rarely this is connected with the post humeral dot. The erect hairs are less abundant beneath than in *longilabris* and entirely lacking above. The elytral row of foveolæ is also not to be found.

Length 12–16 mm = 48–.64 inch.

Habitat.—San Juan and San Miguel Mountains, Colorado, at an elevation of 9500 to 12,000 feet.

The bronze form of this variety was found along a sandy road near the top of King Solomon Peak, Needle Mountains, San Juan Range, Colorado, at an elevation of 9500 feet, July 29th to August 7th. The flight was heavy, slow and weak, and Mr. Oslar says this species seems to prefer running to flying. The green form was found on the southwest slope of Mt. Wilson of the San Miguel Range, Colorado, at an elevation of 12,000 feet, July 18th to 27th. It was found in a grassy valley of about half an acre, just at the timber line, situated at the base of a perpendicular angle of the mountain which afforded shelter from the terrific winds.

I take pleasure in dedicating this variety to Mr. Ernest J. Oslar, who first made it known to me, and whose labors have added materially to our knowledge of Colorado Coleoptera.

Var. **vestalia** n. var.—Form as in *longilabris* but more convex; above bright coppery bronze, shining; beneath metallic green, shining; or metallic green above and beneath; elytra immaculate, granulate-punctate and with an

irregular series of foveæ on each elytron parallel with the suture; there are also a few foveæ in the subhumeral depression. The labrum is feebly tridentate. Above there are a few erect hairs at the side of the thorax; beneath as in *longilabris*. There is a feeble depression on the elytra where the middle band should be, but scarcely any interruption of the punctuation.

Length 14 mm.=.56 inch.

Habitat.—Maiden, Montana; June 17, 1890.

Described from male and female given to me by Mr. Fred. C. Bowditch, who has a number of specimens in his collection.

Var. **montana** Lec., 1861, Proc. Ac. Phil., p. 338; Schaupp, *l. c.*, p. 87.
Length 12 to 14 mm. = .48 to .56 inch.

Habitat.—Utah; Nebraska; Montana; Soda Springs, Idaho; Aweme, Manitoba; mountains between Hope and Okanagan, B. C., September; Laramie, Wyoming, early in Spring.

Black above and beneath, more shining than in *longilabris*, elytra also less deeply punctate, with only a transverse sinuate, obtusely reflexed white middle band, often wanting. Schaupp states that the labrum of the ♀ is black, but this is only sometimes true. The labrum in the specimens I have examined appears to be more evidently tridentate, but this also would probably not hold good in a large series. Prof. Wickham expresses an opinion that this form is entitled to specific rank, but it appears better to me to keep it as a variety so as to emphasize its close relationship with *longilabris*.

Dr. Williston took this variety at various localities in southern Wyoming, more frequently along hillsides and not especially on bare ground.

Typical *longilabris* has lately been found in considerable numbers by Mr. Edw. D. Harris at Mt. Desert on the coast of Maine. The island rises to a considerable height, and this species occurred generally on elevated wooded roads and paths in the southern portion. The insects were not shy, but when startled their flight was long, steady, not rapid, and at a greater height than usual with other species.

C. perviridis Schaupp, *l. c.*, 1883, p. 87, pl. 1, fig. 20.
Length 13 mm.=.52 inch.

Habitat.—Sierra County, Cal.; Placer County, Cal. July. Also Oregon, Utah and Newfoundland, according to Schaupp's synopsis, but these localities are probably based upon green specimens of *longilabris*.

This species is more slender than *longilabris*, the elytra are more convex and the depression about the suture at the basal third is lacking or feeble. The subsutural row of foveæ is very faint. Vivid green above and beneath; elytral markings consist of humeral lunule, almost or quite interrupted, middle band broad on the margin entering transversely and slightly sinuate at its slender extremity and a large subapical dot. The structural characters are similar to those of *longilabris* with which this species is closely related. It differs, however, more than any of the varieties previously described and is, I think, entitled to specific rank. The name is applied in many collections to any green specimens of *longilabris* which is incorrect.

I am indebted to Mr. Charles Fuchs for the loan of Prof. Schaupp's type of this species.

In Mr. River's collection there is one specimen which is greenish black above.

NIGROCŒRULEA group.

Thorax convex, almost margined, slightly narrowed behind; front hairy, labial palpi ♂ pale at base; elytra convex, indistinctly punctured with a row of small shallow foveolæ near the suture; thorax short, scarcely rugose, with depressed hairs at the sides; elytra sericeous, dark blue with only a small apical lunule.....**nigrocœrulea.**

C. nigrocœrulea Lec., 1848, Ann. Lyc. iv, 181, pl. 14, fig. 9; Schaupp, *l. c.*, pl. 1, fig. 23.

Length 13.5–14 mm=.54–.56 inch.

Habitat.—New Mexico; Arizona; Colorado (*fide* Schaupp).

Dark blue or purplish all over, sericeous, surface above similar to *obsoleta*, head glabrous, finely rugose; labrum three toothed; thorax hardly rugose, hairy at the sides; elytra obsoletely punctulate, with a row of foveolæ near the suture, which in some specimens are hardly visible; the only elytral marking is a faint apical lunule. Prof. Schaupp says, "resembles *punctulata* var. *micans*, but is stouter," but the surface is so entirely different that this statement is rather misleading. I have not seen any specimens except those in the Leconte and Horn collections. The specimens taken by Prof. Wickham at Alpine, Texas, which I thought might be *nigrocærulea* are not this species. The following is a translation of Dr. Leconte's description:

"Purplish-black, sericeous shining, front bald slightly rugose, "striate on each side, thorax moderately convex, longer than wide, "sparsely rugose, clothed at the sides with sparse depressed white

"hairs, elytra less convex, obsoletely punctate, impressed towards "suture with a row of blue foveæ, obsoletely white apical lunule; "beneath sparsely clothed at the sides with erect white hairs; "labrum white in both sexes, tridentate, obsoletely in the male but "distinctly in the female; palpi male pale at base. Length .50 to ".57." One pair found near Bent's Fort on the Arkansas River. (About 100 miles east of Pueblo, Col., and between Upper Dry Creek and Lower Dry Creek.)

Bowditchi group.

C. robusta n. sp.

Form stout; dull green above, varying to blackish blue, dark blue shining beneath; elytra immaculate; head glabrous, finely striate in front and between the eyes, finely granulate at the back; labrum short, strongly three toothed; thorax broader than long, flat, almost margined, rounded at the sides, slightly narrower behind, surface visibly punctulate; impressions moderately deep, brighter at base; a fringe of hair on each side; elytra broad, conjointly rounded at apex, not serrulate, uniformly finely punctate; a few foveolæ in the subhumeral impressions and a row on each elytron near the suture. The elytra bear vague shallow impressions about their middle. Beneath scarcely hairy, a few hairs on the flanks of the thorax, on the pleuræ, coxæ, legs and palpi; none on the abdomen.

Length 12 mm.=.48 inch; width, 4.5 mm.=.18 inch.

Habitat.—Alpine and Marfa, Tex.; Deming, N. Mex. July.

This insect was first distributed by Prof. Wickham as a robust form of *micans;* later, on an erroneous determination of mine, as *nigrocærulea* Lec. On comparison with Dr. Leconte's type I find its elytra are scarcely punctured, while in this species they are decidedly so, and the entire form is in *nigrocærulea* much flatter. The comparison by Leconte and Schaupp with *punctulata* seems misleading.

C. Bowditchi n. sp.

Form robust; greenish-black above, dark blue beneath; elytral markings consist of broad marginal line, expanded at the middle and with a short oblique branch representing the middle band. The elytra are sericeous and the punctures indistinct towards apex, where the foveolæ also become very shallow. Otherwise its characters are identical with the preceding to which it is closely related.

Length 11 mm.=.44 inch; width, 4.5 mm.=.18 inch.

Habitat.—Vicinity of Durango, Colo. July and August.

Two specimens collected by Mr. Fred. C. Bowditch, one now in his collection and one in the collection of Mr. Samuel Henshaw.

Scutellaris group.

Thorax convex, not margined, slightly narrowed behind; front hairy in ♂,

nearly bald in ♀, palpi black; elytra convex, impunctate; labrum short, bisinuate, tridentate; not hairy above but beneath the palpi, femora, flanks of thorax and anterior and middle coxæ are clothed with long white hair; there are also a few short hairs on the abdomen; interocular striæ numerous and fine.....**scutellaris.**

C. scutellaris Say, 1823, Jour. Ac. Phil. iii, p. 140; Lec. Ann. Lyc. iv, 176, pl. 13, fig. 2; *rugifrons* Dej., Spec., 1825, i, p. 51; *denticulata* Hentz, Trans. Am. Phil. Soc. iii, 254, pl. 2, fig. 1; *modesta* Dej., Spec., i, 52; *obscura* Say, Trans. Am. Phil. Soc. i, 418 (this name is preoccupied); *unicolor* Dej., Spec., i, 52; v, 210; Chev. Col. Mex. ii, fasc. 8, nr., 177; *Lecontei* Hald., Proc. Ac. Phil. vi, 1853, p. 361; *nigrior* Schaupp, *l. c.*, p. 87; pl. 2, fig. 25-31.

Length 12 mm=.48 inch.

Habitat.—(Including all varieties) Canada; Mass.; R. I.; N. Y.; N. J.; Pa.; Md.; N. C.; S. C.; Ga.; Fla.; Ala.; La.; Tex.; Kan.; Ark.; Neb.; Colo.; Ia.; Wis.; Ill.; Ind.

This is a variable species in color and markings, and the names which have been given to it refer to these variations. The following are known to me:

Scutellaris Say.—Head and thorax usually green sometimes blue; elytra all cupreous, or sometimes partially suffused with green from the base down, or even green partially suffused from the apex cupreously; usually immaculate, rarely with the apical lunule and a marginal dot. Occurs in Colo.; Kan.; Neb. Sports also occur approaching the color of *Lecontei.*

Var. *unicolor* Dej.—Green or blue immaculate. Occurs in Mass. (an occasional specimen among many *rugifrons*); N. C.; S. C.; Fla.; Ala.; La.; Tex.; Colo. (rarely). I have one specimen from Wilmington, N. C., in which the color is purplish green, intermediate between this variety and *scutellaris.*

Var. *modesta* Dej.—Black, with apical lunule and one or two marginal dots rarely confluent. An occasional specimen exhibits a dull green reflection. Occurs in N. Y.; N. J.; Pa.

Var. *nigrior* Schaupp.—All black, immaculate. Occurs in N. Y. (an occasional specimen among many *modesta*); Ga.; Fla.; Ala.

Var. *rugifrons* Dej.—Green or blue, with apical lunule, and one or two marginal dots, rarely confluent. Occurs in Mass.; R. I.; N. Y.; N. J.; Md.; N. C.

Var. *Lecontei* Hald.—Cupreous, coppery bronze or greenish bronze with apical lunule, one spot or often two spots, or even with a humeral spot as well, all of which in Canadian specimens become confluent.

Occurs in western Canada (Hamilton); Ind.; Ill.; Wis.; Ia.; Kan.; Neb.

In the diagnosis I have described the elytra as impunctate and this is true generally, and as compared with other species, but it must be admitted that in some of the Southern specimens of *unicolor* the elytra are evidently punctulate.

The observation that the front is hairy only in the ♂ and scarcely at all hairy in the ♀ is due to Mr. H. C. Fall (Ent. News, xii, p. 310). This species and its varieties delight in open sandy spots, free from vegetation. In the Pine Barrens of New Jersey, where there are square miles of white sand covered with pines and little oaks, but traversed by innumerable roads and wood paths, *modesta* is abundant from the earliest warm day in Spring until June and again after September 1st; *rugifrons* occurs also but less abundantly. There my friend, Mr. William T. Davis, and I have spent many hours, catching and liberating specimens of *modesta* and *rugifrons*, seeking to find hybrids between the two, and finally concluding that, although they are evidently very closely allied, these two varieties breed true to themselves as a general rule. I, therefore, propose to retain all the varietal names for this species now in use.

When a net is placed over a *modesta* or a *rugifrons*, the beetle will often bury itself in the dry sand and evidently lies very still. Often it cannot be found while the net is on the ground, but directly our careful moving of the sand discovers its hiding place, it becomes as active as a "jack-in-a-box" and usually makes its escape.

Pulchra group.

Thorax convex, not margined, narrowed behind; palpi black; elytra convex, polished, strongly punctate at base, finely punctate at middle, not punctate at apex.

Thorax smooth; elytra brilliantly red cupreous with blue margin; front hairy. **pulchra.**

Thorax slightly wrinkled at sides; elytra black or blue; front bald; elytral tip not serrulate. . . . . **Hornii.**

Thorax sparsely and slightly rugose; elytra bluish-green; front hairy; elytral tip serrulate . . . . . **pimeriana.**

C. pulchra Say, 1823, Jour. Ac. Phil. iii, p 142; Lec. Ed. ii, 91; Dej. Spec. ii, 421; Lec. Ann. Lyc. iv, 175; Schaupp, *l. c.*, p. 88, pl. 1, fig. 21.
Length 15–19 mm.=.60–.76 inch.

Habitat.—Col.; Kan.; N. Mex.; Ariz. May, June, July.

Recent captures are by Mr. Oslar at Chimney Gulch, Col.; Prof.

Townsend at Navajo Springs, Ariz.; southwestern Kansas, by Prof. Williston, and along the line of the Union Pacific Railway from Hayes to Wallace. Usually the only markings are a transverse white abbreviated line at the middle, and sometimes a round humeral dot, but in the collection of Mr. Harris are specimens with middle band and two humeral dots, and with middle band and two apical dots. Above, this species is not hairy, save on the front of the head and the scape of the antennæ; but beneath, the palpi, legs, flanks of thorax and pectus are quite thickly clothed, and there are a few hairs also on the abdomen. The labrum is short and truncate in front and obscurely one toothed. The interocular striæ are coarser than usual. Well preserved specimens are of an exceedingly brilliant coppery red color, but I have also seen much duller specimens.

C. Hornii Schaupp, 1884, *l. c.*, p. 88, pl. 1, fig. 22; *anthracina* Horn (preoccupied), 1880, Trans. Am. Ent. Soc. viii, 139.
Length 13-16 mm.=.52-.64 inch.

Habitat.—N. Mex.; Alpine, Texas, June 28th, elevation 4400 to 6000 feet. Taken by Prof. Wickham in the western part of the State, blue and black forms intermingled on broad flats of bottom land used as pasture.

Black, shining, glabrous above and sparsely hairy beneath; or with purple elytra and green head and thorax; or with purple head and thorax and the elytra almost black; head bald in front; labrum short with an acute tooth at middle; thorax slightly wrinkled at sides; interocular striæ feebly developed; head behind the eyes finely punctulate; elytra not punctate near the apex; no markings at all on the specimens seen; not at all hairy above; beneath, only the palpi and coxæ are clothed, a few scattered hairs on the flanks of thorax and legs.

C. pimeriana Lec., Proc. Ac. Phil. 1866, p. 363; *viatica* Lec. (preoccupied), Trans. Am. Phil. Soc., 1856, xi, 62; Schaupp, *l. c.*, p. 88, pl. 1, fig. 24.
Length 12 mm.=.48 inch.

Habitat.—New Mexico and Mexico.

Resembles the preceding, but the front is hairy, the head and thorax green, the elytra violet or purple with a short transverse middle band. I have seen only the single specimen in the Leconte collection. "The head is finely and sparsely rugose; labrum obso-
"letely three toothed; thorax finely rugose; elytra with shallow punc-
"tures, which are nearly obliterated near the tip, with a humeral dot

"and a short transverse marginal line" (Schaupp synopsis). This species would seem to be very near the blue forms taken by Prof. Wickham at Alpine, Texas, were it not for the hairy front of *pimeriana*, which is very apparent in the type, and the serrulate tip of the elytra.

SEXGUTTATA-PURPUREA group.

Thorax convex, not margined, narrowed behind.
Elytra convex, granulate-punctate.
Front not hairy.
Immaculate or marked with dots, scarcely hairy beneath..**sexguttata.**
Middle band complete, more hairy beneath.....**patruela.**
Front hairy.
Thorax and elytra nearly the same color.
Immaculate or with dots and a normal middle band.....**purpurea.**
Marked with a marginal line and a normal middle band.**cimarrona.**
Marked with dots and an elongate middle band.....**10-notata.**
Thorax and head green, elytra cupreous with or without dots and a normal middle band.....**splendida.**

C. sexguttata Fab., 1775, Syst. Ent., p. 226; Say, Trans. Am. Phil. Soc., new ser., 1818, i, p. 414, pl. 13, fig. 4; Dej., Spec. i, 53; Lec. Ann. Lyc. vi, p. 176; Schaupp, *l. c.*, p. 88, pl. 2, fig. 32.

Length 10–14 mm.=.40–.56 inch.

Habitat.—Canada; Me.; Mass.; N. H.; N. Y.; N. J.; Pa.; Md.; N. C.; Ga.; La.; Iowa; Wis.; Tex.; Dak.

Commonly green above and beneath, often with a strong bluish reflection; markings ordinarily either six or eight white dots, more rarely reduced to four, two or none. Head bald in front, interocular striæ strong and numerous, labrum strongly three toothed; thorax slightly rugose, strongly punctured and with deep impressions; elytra granulate punctate with marginal, anteapical and apical dot and sometimes a discal dot also, or sometimes with part or all lacking; not hairy above and beneath, only scattered hairs on the usually hairy parts. Lives in shady roads, clear woods or pastures.

Var. **Harrisii** n. var.

Length 11–13 mm.=.44–.52 inch.

Habitat.—Southwestern Catskill Mountains, N. Y.; Lake Memphremagog, Canada; Mountains of N. C.; western Conn.; occurring always at an elevation of 1000 feet or over.

I take pleasure in dedicating this variety to its discoverer, Mr. Edw. D. Harris. It differs from typical *C. sexguttata* in the color, which is olivaceous green, and in living only at a considerable elevation.

Mr. Harris collected assiduously about Stamford, N. Y., during the past summer, and in a large series of specimens there was practically no variation from the peculiar color of the specimens first noticed in Litchfield County, Conn. Further investigation of mountain forms collected by Mr. Beutenmüller in North Carolina, showed that the expected character was again developed.

Var. **violacea** Fab., Syst. El. i, p. 232; Schaupp, *l. c.*, p. 89, pl. ii, fig. 33 (not fig. 34, which is intended to represent the eight spotted form of *sexguttata*).
Length 12–14 mm.=.48.–.56 inch.

Habitat.—Onaga, Kansas; Mr. F. F. Crevecoeur.

Differs from *sexguttata* by its rich violaceous color and by its tendency to be immaculate, though it occurs two, four and six spotted. Mr. Crevecoeur takes the true *violacea* along dry creek beds in company with the immaculate form of *sexguttata*. In many collections immaculate specimens of *sexguttata*, either with or without the bluish reflection that is not uncommon, stand under the name *violaeea*, but I believe, incorrectly. The true *violacea* is one of the most beautiful of our species.

My friend, Mr. George Coverdale, has sent me a series of *sexguttata* from Vowell's Mill, La., in which every degree of maculation is represented in specimens taken at one time and place. *C. varians* Ljungh, identified by Dr. Walther Horn, of Berlin, as a form of our *sexguttata* in which the markings are reduced to a marginal dot, is represented in the series sent me by Mr. Coverdale and, if correctly placed as an American insect, is to be regarded as a synonym.

C. patruela Dej., 1825, Spec. i, p. 62; Gould, Bost. Journ. i, p. 44, pl. 3, fig. 4; Lec. Ann. Lyc. iv, p. 178; Schaupp, *l. c.*, p. 89, pl. ii, fig. 35.
Length 12–14.5 mm.=.48 .58 inch.

Habitat.—Wis.; Pa.; Md.; N. Y.; N. C.; in shady paths on hills.

Differs from *sexguttata* in being usually larger; in having a complete middle band and a humeral lunule, rarely complete, usually represented by humeral and posthumeral dots; in the color which is usually darker; in the pilosity beneath, the metathorax being well covered and the density of the hairs on the mesothorax, coxæ and femora being much greater than in *C sexguttata;* and in being confined to comparatively few stations.

Recent captures are by Mr. Nathan Reist and Mr. Ezra J. Nolt on Chickies Rock, which is a high, rocky and wooded mound on

the left bank of the Susquehanna near Chickies Station, between Columbia and Marietta, Pa.; by Mr. John D. Sherman, Jr., on wooded hill northeast of Peekskill, N. Y. Mr. Blanchard has taken it on the mountain roads of western North Carolina, with *C. sexguttata* and *unipunctata*.

Specimens of *sexguttata* occasionally occur with a middle band, and clearly show the intimate relation of these two species, but the rarity of such specimens shows that they should be regarded as sports.

Var. **consentanea** Dej., 1825, *l. c.*, p. 63; Schaupp, *l. c.*, p. 89, pl. 2, fig. 36.
Length 12–14 mm.=.48–.56 inch.

Habitat.—Pa.; Neb. (*fide* Schaupp); Pine Barrens of New Jersey. Early spring until June, and from September to frost.

Like the preceding, but black above and beneath. It is the least abundant of the Pine Barren Cicindelæ, but under favorable conditions a dozen may be taken in a day. It has been taken by Mr. Wm. T. Davis and Mr. Edw. D. Harris at Lakehurst, N. J., and by Mr. Harris and the writer at Brookville, N. J. The Philadelphia collectors take it at Atco. It frequents the roads through the pine woods, and seems to prefer those which are little used, and are consequently harder and more blackened by decaying vegetable matter.

C. purpurea Oliv., 1794, Ent. ii, 33, p. 14, pl. 3, fig. 34; Say, Trans. Am. Phil. Soc., new ser., i, p. 419; Lec. Ann. Lyc. iv, 176; *marginalis* Fab., El. i, 240; Herbst, Käfer, x, 175, pl. 171, fig. 10; Dej. Spec. i, 55; v, 210; Schaupp, *l. c.*, p. 89, pl. 2, fig. 37.
Length 12–16 mm.=.48–.64 inch.

Habitat.—(All varieties included.) Canada from Province of Quebec to Vancouver, and in all the United States, except possibly the extreme southern States.

Exceedingly variable in color and markings, this species is known by the hairy front and granulate punctate elytra from closely allied forms. Thorax convex, not margined, narrowed behind, deeply impressed, granulate and rugose; labrum three toothed; a few hairs above on the side of the thorax; beneath, the palpi, flanks of prothorax, coxæ and legs are conspicuously hairy, the abdomen sparingly so. Omitting *splendida*, *cimarrona* and *decemnotata*, which are sufficiently differentiated to rank as species, the differences in color, marking and distribution, make the following varieties:

Cupreous above.
Short oblique middle band, apical dot, usually anteapical dot, rarely humeral dot ..... **purpurea.**

Short transverse middle band, almost attaining the margin, usually apical dot. **transversa.**

Complete, sinuate, middle band, apical dot, anteapical dot (lacking in *limbalis* Lec), humeral and post-humeral dots, the humeral often indistinct or lacking..... **limbalis.**

Green above; sometimes with cupreous reflection on thorax.

Markings like *purpurea*, thorax coppery..... **graminea.**

Thorax green..... **lauta.**

Markings like *transversa*..... **denverensis.**

Markings like *limbalis*..... **spreta.**

Bluish green above and beneath, elytra greenish or coppery.

Markings like *transversa*..... **ludoviciana.**

Black above and beneath.

Markings like *purpurea*..... **Audubonii.**

Apical dot only or immaculate..... **plutonica.**

Typical *purpurea* Oliv. Reddish cupreous, margins and suture of elytra and depressions of thorax brilliant green; beneath bluish green; markings consist of an oblique scarcely sinuate middle band not attaining the margin and an apical dot. These are always present and usually there is also an ante-apical dot, and sometimes even a humeral dot as well. The color is often more or less greenish, and specimens occur which cannot be distinguished from the *graminea* of Colorado.

Occurs throughout the range given for the species.

Var. **transversa** n. var.—Color of *purpurea* from which it differs by the middle band, which is short and transverse, situated almost at the extreme margin of the elytra. The difference is slight and does not seem to be supported by geographical distribution, and I have assigned a name, partly because I have frequently seen this form separated in collections and usually erroneously classed as *spreta*.

Occurs in Ill. and N. J.

Var. **limbalis** Klug, 1834, Jahrb. i, 29; *limbalis* Lec. Ann. Lyc. iv, 177; Schaupp, *l. c.*, p. 90, pl. 2, figs. 42, 43, 44.

Color of *purpurea* (greenish specimens are *spreta*), markings consist of a long sinuate middle band starting from the margin transversely, and several dots; when complete there are four, representing the apical and humeral lunule, but any of them may be lacking, except the apical, which is the most persistent all through the varieties of this species.

Occurs in Manitoba; Maine; N. J.; Ill.; N. Y.; Ky.; Ohio; Iowa; Wis.; Colo.; Kan.

Var. **graminea** Schaupp, 1883, *l. c.*, p. 89, pl. 2, fig. 38.

Reproduces the markings of *purpurea*, but the color above is green with a cupreous tinge on the thorax and on the margin of the elytra. The cupreous tinge disappears as the locality moves westward, and Pacific coast specimens may be green without any cupreous shade. As noted under *purpurea*, a specimen occasionally occurs in the East which can hardly be separated from *graminea*, but the true range of this variety is in the West.

Occurs in Kan.; Colo.; Cal.; Dak.; Mont.; Or.

Var. **denverensis** Casey, 1897, Ann. N. Y. Acad. Sci. ix, p. 297.

Bright golden green above, brighter than in *sexguttata*, green beneath. Normally the markings consist of a short transverse dash at the middle and an apical dot or incomplete lunule; but rarely the humeral dot, post humeral dot, or the ante-apical dot may be present and Mr. Harris has one specimen in which, besides the post-humeral dot, the middle band is complete.

Occurs at Denver, Colo.

Var. **ludoviciana** n. var.—Form of *purpurea*, blue beneath, head and thorax blue, elytra green with blue side margins and suture and a faint coppery lustre on the disk, not evident in all specimens. Markings consist of a small transverse dash at the middle, sometimes lacking, and a transverse apical dot. Labrum three toothed, head punctate in front, interocular striæ strong and numerous, punctate behind the eyes; the usual brush of hair between the eyes; thorax punctate, rugose, concolorous; elytra granulate-punctate; not hairy above, beneath, the palpi, flanks of thorax and legs are moderately hairy.

Occurs at Vowell's Mill, Nachitoches Parish, in the northwestern part of Louisiana. Collected by Mr. George Coverdale. April and September.

Var. **spreta** Lec., Ann. Lyc. iv, 177, pl. 13, fig. 7; Schaupp, *l. c.*, p. 90.

This variety is simply a *limbalis* in which the usual cupreous color has become completely suffused with green, as in those eastern specimens of *purpurea* which mimic the western *graminea*.

Mr. Harris took a number of this form running with typical *limbalis* at Mt. Desert. It is doubtful whether the name should be retained at all. Prof. Schaupp describes this form as "black with markings complete," but the original description, the original colored figure and the specimen in Leconte collection show this to be an error.

Occurs in Maine and Wisconsin.

Var. **Audubonii** Lec., 1845, Bost. Jour. v, 207, pl. 18, fig. 7; Schaupp, *l. c.*, p. 90, pl. 2, fig. 39.

Black above and beneath, elytra with short, oblique, slightly sinuate middle band, not attaining the margin, and apical dot; sometimes with ante-apical dot also, and more rarely with a faint humeral dot. The usual brush of hair is very conspicuous and the thorax above is hairy at the sides; beneath, the palpi, the flanks of the thorax and the legs are very hairy, and there are some hairs on the abdomen.

Occurs in Ill.; Neb.; Kan.; Colo.; Wis.; Dak.; Wyoming.

Mr. Oslar writes that this variety is abundant in dry sandy spots on the prairie around Denver, and occurs also along the damp sandy banks of mountain streams throughout the State.

Var. **plutonica** Casey, *l. c.*, p. 296.

Habitat.—Placer Co., Cal.; Alpine, Oregon, June 27th.

Black above and beneath, elytra immaculate except for an apical dot present in some specimens. The presence of a row of faint foveolæ along the suture is a character which assists in separating this variety.

Var. **lauta** Casey, *l. c.*, p. 296.

This variety is known to me by a single specimen and the author's description, and I am unable to place it accurately without a larger series. It appears, however, to run very close to the Californian forms of *graminea*. I copy here the original description: "Similar in form "to *purpurea*, but still shorter and a little more depressed, green, the "head and prothorax with a slight coppery reflection, the legs polished, "metallic and paler green, the elytra dull, of a deep and very rich "sericeous green with a vivid blue lateral border. Markings as in "the typical *purpurea*, a transverse and moderately reflexed median "dash, not attaining the sides, and a small sutural remnant of the "apical lunule. Prothorax very short and transverse, about twice "as wide as long. Front sparsely punctate and having erect blackish "setæ; labial palpi black."

Occurs in Siskiyou Co., Cal.

Mr. Harris has specimens of *graminea* from Gold Hill, Oregon, which apparently correspond with the description of *lauta* Casey, and which were taken with specimens of typical *graminea*. The name may in any event be retained for those Pacific forms which are all green and feebly marked, as Schaupp's description really covers the Kansas and Colorado form only.

The varieties noted above, which are strongly defined, are *limbalis*, *denverensis*, *ludoviciana*, *Audubonii* and *plutonica*. Of the others, *transversa* and *graminea* run more or less into *purpurea*, *spreta* is hardly separated from *limbalis*, and *lauta* is doubtfully separated from *graminea*.

I have in my collection several unique specimens which cannot be included with any of these varieties, and no doubt the reader will have others, and they had best remain unnamed until a larger series shows clearly where they belong.

C. cimarrona Lec., 1868, Trans. Am. Ent. Soc. ii, p. 49; Schaupp, *l. c.*, p. 89, pl. 2, fig. 40 (this figure gives an unsatisfactory representation of the marginal band and is misleading).

Length 13-15 mm.=.52-.60 inch.

Habitat.—Colo. and N. Mex.

Black above and beneath, or green, sometimes with a coppery lustre, especially on the thorax and beneath; elytral markings consisting of a marginal band, sometimes incomplete, with branches indicating the usual humeral lunule, middle band and apical lunule. Otherwise its characters are identical with those of *purpurea*. I separate this species because the type of the elytral markings is radically different, and notwithstanding the variations in color, is constantly preserved, thereby suggesting a form too well established to be called a variety.

Taken in New Mexico by Prof. Snow; at Garland, Colo., 8000 feet elevation, August 28th. Prof. Popenoe (quoted by Wickham) says that it occurs singly on bare clay soils about open prairies in South Park, Colorado.

C. decemnotata Say, 1818, Journ. Ac. Phil. i, 19; Am. Ent. (Lec. Ed) i, 34, pl. 18, fig. 1; Schaupp, *l. c.*, p. 90, pl. 2, fig. 41 (the middle band in this figure is not long enough).

Length 11-14 mm.=.44-.56 inch.

Habitat.—Col.; Cal.; Neb.; Mont.; Wyom.; Kan.; Idaho.

Green, above sometimes tinged with cupreous; beneath bluish green; elytra dull green margined with bright green or blue, with four white dots and a suddenly bent, very long, middle band not dilated at tip. The humeral and post humeral dots may be missing and the middle band may be reduced to a marginal spot. Well preserved specimens are very hairy, the hairs being placed as in *purpurea* to which this species is allied.

This species has been taken by Dr. Williston in southern Wyoming among the Buffalo grass. I have a specimen taken in May at Helena, Montana.

C. splendida Hentz, 1830. Trans. Am. Phil. Soc. iii, 254, pl. 2, fig. 3; Schaupp, *l. c.*, p. 90, pl. 2, fig. 45, 46.
Length 12–15 mm.=.48.–.60 inch.

Habitat.—N. Y.? N. C.; Neb.; Kan.; Mo.; Tex.; Colo.

Head and thorax green or blue, elytra cupreous with green margins; beneath green. Elytral markings very variable, from none at all to complete markings of the *limbalis* type. The usual markings of *splendida* are a short middle band and an apical dot.

Mr. Knaus states that *splendida* occurs with *purpurea* in Kansas and is the more abundant.

Var. **amœna** Lec., 1848, Ann. Lyc. iv, 177, pl. 13, fig. 3; Schaupp, *l. c.*, p. 90.

Habitat.—Northern Missouri and Kansas.

The type of *amœna* in the Leconte collection is a *limbalis* with greenish coppery thorax and, as I have received from Mr. Knaus specimens of *splendida* with the full *limbalis* markings, I have no doubt that *amœna* is an extreme form of *splendida*, bearing the same relation to that species that *limbalis* does to *purpurea*. As it occurs with typical *splendida* there is no geographical reason for separating it, and I retain the name only for convenience of cabinet arrangement to represent the forms of *splendida* in which the middle band and six to eight dots are present.

Formosa group.

Thorax convex, not margined, subquadrate; palpi of ♂ usually pale at base; elytra convex, markings broad and usually connected at margin; front, thorax and abdomen very hairy; larger than the average.

Elytra feebly granulate-punctate.
- Coppery red, middle band obtusely bent ..... **formosa.**
- Greenish-coppery or brown bronze, middle band more deflexed. **generosa.**
- Greenish or coppery bronze, humeral lunule and middle band obliquely bent, more slender in form ..... **venusta.**

Elytra more strongly punctured, not granulate. Form less convex.
- Markings very broad, sometimes confluent ..... **latesignata.**
- Markings of nearly normal width, connected at margin but not confluent. **tenuicincta.**

This group differs from all preceding groups by the hairiness of the sides of the abdomen.

C. formosa Say, 1818, Trans. Am. Phil. Soc. i, 422; Am. Ent. i, 35, pl. 18, fig. 2; Dej. Spec. ii, 424; Lec. Ann. Lyc. iv, 180; Schaupp, *l. c.*, p. 91, pl. 2, fig. 48.

Length 17–18 mm.=.68–.72 inch.

Habitat.—Kan.; Tex.; Col.; Neb.

Red cupreous, margins shining, beneath metallic blue or green; head granulate rugose, hairy in front and beneath the eyes; thorax broader than long, granulate, very hairy on the flanks; elytra feebly granulate-punctate, the punctures rather distant and the surface between them very minutely punctulate; markings consist of humeral lunule, middle band obtusely bent but only slightly deflexed, and apical lunule, all narrowly connected along the margin; interocular striæ deep and numerous; beneath, the palpi, trochanters, femora and sides of thorax and abdomen are very hairy; labrum strongly three toothed.

This species inhabits a comparatively limited district and presents very little variation in its markings. Mr. Knaus says its favorite places are in the short grass and weeds near the edges of sand dunes and "blow-outs." It occurs from the end of May to July and again in the fall.

Var. **generosa** Dej., 1831, Spec. v, 231; Gould, Bost. Journ. i, 42, pl. 3, fig. 2; Schaupp, *l. c.*, p. 91, pl. 2, fig. 49–50.

Length 16.5–18 mm.=.66–.72 inch.

Habitat.—Mass.; N. Y.; N. J.; Penn.; Ohio; Ill.; Wis.; Iowa; Mo.; Ky.; Colo.; Manitoba.

Very similar to the preceding except in color, markings and geographical distribution. The markings are subject to great variation as well as color. The constant difference is in the direction of the middle band which is always more deflexed than in *formosa*.

Dull red cupreous, green beneath; or brown bronze, dull green beneath; or green bronze with cupreous reflection, dull green beneath; markings consist of humeral lunule, middle band strongly deflexed (its extremity almost reaching the suture), apical lunule, all connected by a narrow marginal band; rarely there is a narrow break in the marginal line behind the humeral and before the apical lunule. Always less shining than *formosa*. Otherwise as in the preceding.

This species occurs abundantly in the Pine Barrens of New Jersey, frequenting the white sandy roads through the woods, preferring the more open spots. We find it there early in spring and its season

lasts until the end of June. It is missing for about two months and reappears early in September to remain through the fall. In Connecticut Mr. Harris finds *generosa* in July and August.

Var. **manitoba** n. var.
Length 15–18 mm.=.60–.72 inch.

I have received from Mr. Norman Criddle, of Aweme, Manitoba, a most interesting series of this variety. The extreme form is figured in which the white markings are so broad that more than half the elytra is white. From this form gradations occur nearly to the most broadly marked forms of *generosa* we have in the east. The middle band in some specimens loses the characteristic deflection of *generosa* in great measure, and more closely approaches the form of *formosa*, and this combined with the narrow markings is shown on plate III.

The color is usually dull brown bronze, but in one specimen it becomes nearly as bright cupreous as in *formosa*. With these specimens Mr. Criddle takes *venusta*, and there is no indication of this species running into *generosa* or *manitoba*. It is a consideration of the intermediate specimens which prevents me regarding *manitoba* as a distinct species, but the uniformly wider white margin and the locality indicate that it is a geographical variety intermediate between *generosa* and *formosa*. I have one specimen from northern Illinois, in which the characters of *manitoba* are in some respects copied, but even in this the width of the apical lunule is much less. This variety is very hairy; above, the vertex (as well as the front) and the thorax are quite thickly clothed; beneath, the sides of the head, the flanks of the thorax, the sides of the abdomen are thickly clothed and the long white hairs on the coxæ and legs are dense and conspicuous. It is even more hairy than typical *generosa*, with which it agrees except as noted.

Habitat.—Aweme, Manitoba.

C. venusta Lec., 1848, Ann. Lyc. iv, 179, pl. 13, fig. 5; Schaupp, *l. c.*, p. 91, pl. 2, fig. 51.
Length 12–15 mm.=.48–.60 inch.

Habitat.—N. Mex., Kan., Neb, Colo., Dak., Mont., Manitoba.

Cupreous, opaque, rarely slightly shining, margins shining; beneath brilliant green; elytral markings consist of oblique humeral lunule, almost reaching the middle band, a middle band rectangu-

larly bent and with a long extremity, sometimes hooked at tip, and an apical lunule, all connected at margin; form slender; head granulate rugose, interocular striæ strong and numerous, labrum prominent and three toothed; thorax subquadrate, granulate, depressions deep; elytra moderately arcuate, granulate punctate, except in the white markings. Hairiness as in the last, but less abundant and especially on the vertex where there is scarcely any. This species has been placed as a variety of *formosa*, from which it is abundantly distinct by its smaller size, more slender form and pattern of maculation.

This species is found plentifully in Kansas by Mr. Knaus in company with *formosa*, by Mr. Oslar at Denver with the same, and by Mr. Criddle at Aweme with *manitoba*.

C. latesignata Lec., 1852, Ann. Lyc. v, 172; Schaupp, *l. c.*, p. 91, pl. iii, fig. 57, 58.

Length 12–14.5 mm.=.48–.58 inch.

Habitat.—Southern California, seashore.

Brownish black, beneath green; elytral markings consisting of humeral lunule obliquely prolonged, middle band rectangularly bent and expanded at margin, apical lunule anteriorly inflected, (*a*) all separated at margin, or (*b*) partly connected at margin, or (*c*) very broadly confluent; head granulate rugose, labrum short, three toothed; thorax broader than long, subquadrate, little convex, granulate, depressions deep; elytra strongly punctured, except in white marks, not granulate.

Abundant on the sea beach at San Diego, Cal., in August, flying on the white sand above the immediate reach of the tide. Mr. Fall says it occurs throughout the whole year, but most commonly in mid-summer.

The form marked (A) in the figures on plate III, is in some collections as *tenuicincta*, but it is not that species, and while extremes are apparently distinct, it is impossible to separate the forms with a large series of specimens.

C. tenuicincta Schaupp, 1884, Bull. Br. Ent. Soc. vi, p. 122.

Length 12–14 mm.=.48–.56 inch.

Habitat.—Colo. (fide Schaupp), Saltair, Utah, June 15–29, collected by Mr. Warren Knaus.

Blackish brown, beneath green; elytral markings moderately broad, consist of humeral lunule, oblique, middle band entering rec-

tangularly, descending far and expanded at tip, apical lunule inflected anteriorly, all connected or nearly connected by marginal band. Head rugose, labrum short, one-toothed or obscurely three toothed; thorax subquadrate, granulate, impressions moderately deep; elytra punctate, not granulate. Less hairy than any other member of this group; above, the sides of the thorax as well as the front are hairy; beneath, the palpi, flanks of thorax and legs are hairy, but the sides of the head are bare, and the hairs on the abdomen are scanty and scattered.

Described by Schaupp from a single specimen from Colorado, this species has recently been found by Mr. Knaus on the shores of the Great Salt Lake. Its affinities are puzzling, as pointed out by Schaupp, but the wide difference in locality prevents its being considered a variety of *latesignata*, and I prefer to regard it as a species of very limited range, connecting in some ways this group with that containing *vulgaris*.

Fulgida group.

Thorax convex, not margined, subquadrate; palpi of male pale at base; elytra convex, punctate not granulate, strongly metallic, shining; markings broad, not connected at margin; surface shining.

Front hairy, humeral lunule oblique ..... **fulgida.**
Front bald, humeral lunule C-shape ..... **echo.**

C. fulgida Say, 1823, Jour. Ac. Phil. iii, 141; Lec. Ann. Lyc. iv, 179, pl. 13, fig. 5; Schaupp, *l. c.*, p. 92, pl. 3, fig. 59.

Length 10–13 mm.=.40–.52 inch.

Hab.—Kan., Neb., Dak., N. Mex., Wyom.

Red cupreous, brilliant, highly polished, sometimes green, beneath green; elytral markings broad, consisting of obliquely descending humeral lunule, approaching and rarely connecting with middle band, middle band entering perpendicularly, bent at a right angle and expanded at extremity, and apical lunule. Head rugose, hairy in front, labrum imperfectly three-toothed, interocular striæ fine and numerous; thorax moderately rugose, hairy at sides, impressed lines deep, green at base; elytra strongly, evenly punctate, apical margin minutely serrulate; beneath, the palpi, flanks of thorax, coxæ and femora are quite hairy, the sides of the abdomen less conspicuously.

Mr. Knaus takes this species along the edges of the salt marsh west of Kackley, Kan., in June and July; Prof. Wickham found it in September at Albuquerque, N. Mex., on a flat sandy spot, a

mile from the river, overgrown with short grass; Dr. Williston reports it abundant in western Kansas and southern Wyoming, frequenting upper banks some distance from water among Buffalo grass.

C. echo Casey, 1897, Ann. N. Y. Acad. Sci. ix, p. 298.
Length 10.8–12 mm.=.43–.48 inch.

Habitat.—Shores of Great Salt Lake, Utah.

Dark brown-bronze, beneath bluish green; elytral markings broad, consisting of **C**-shape humeral lunule, middle band entering perpendicularly, bent at a right angle and almost reaching the suture, and an apical lunule. Head rugose, bald in front, labrum imperfectly three toothed, interocular striæ fine and numerous, reaching almost to the labrum; thorax as in preceding, but less hairy; elytra coarsely and uniformly punctate, margin not serrulate. The hair beneath distributed as in preceding.

Apparently confined to the locality stated. My specimens were collected by Mr. G. Wesley Browning, April 28th, who very kindly made several excursions in search of the species.

The author compares this species with *senilis*, but may have been working with erroneously determined material, as *senilis* is often misrepresented in collections.

Willistoni group.

Thorax convex, not margined, subquadrate, palpi of male pale at base; elytra less convex, markings broad sometimes connected at margin, dilated in front of the middle in ♀, punctate not granulate, apical margin minutely serrulate; surface shining.

Bronze, with connected markings ..... **Willistoni.**
Bluish green, with disconnected markings ..... **pseudosenilis.**

C. Willistoni Lec., 1879, Bull. U. S. Geol. Geog. Survey, v, 507; Schaupp, *l. c.*, p. 91, pl. 3, fig. 60 (the figure is too brightly colored).
Length 10.5–14 mm.=.42–.56 inch.

Habitat.—Lake Como, Wyoming, June.

Brown or green bronze, beneath metallic green or blue, elytral markings broad, consisting of humeral lunule, middle band entering perpendicularly, rectangularly bent and very long, almost reaching the apical lunule at the suture and apical lunule, all connected at the margin, the connection with the apical lunule very narrow. Head rugose, interocular striæ fine and numerous, almost reaching the labrum, which is imperfectly three-toothed, scarcely hairy in front; thorax coarsely punctate, subquadrate; impressions deep,

bearing a few hairs at the sides; elytra uniformly coarsely punctate, not granulate, very plainly dilated a little in front of the middle in the female. Beneath, the palpi, flanks of thorax, legs and sides of abdomen are moderately hairy.

This species is confined, as far as I know, to the shores of Lake Como in Wyoming, where it runs on bare alkaline mud. My specimens were taken by Mr. Knaus in June, 1901, he having purposely gone to the locality whence came the type specimens. The specimens in the LeConte collection would favor the union of this species with *fulgida* in some respects, but the form of the female elytra is alone sufficient to differentiate it.

C. pseudosenilis Walther Horn, 1900, Ent. Nach., xxvi, p. 117.
Length 13–14 mm.=.52–.56 inch.

Habitat.—Owen's Lake, Inyo Co., Cal.

Green bronze; beneath, bluish green, elytra almost black, with markings broad, consisting of humeral lunule, middle band and apical lunule shaped as in the preceding, but not connected at margin. Head not hairy in front, otherwise as in the preceding; head and thorax also as in the preceding. Beneath, scarcely hairy, the few hairs being confined to the palpi, flanks of thorax and femora.

This species is often erroneously placed under the name *senilis*, with which it has no close relationship. It might be regarded as a variety of *Willistoni*, but in view of the differences in marking, in hairiness and in locality, I consider them as distinct species, each confined to a very limited area. It is possible that intermediate forms may be found at other alkaline lakes in the west.

Senilis group.

Thorax convex, not margined, subquadrate; palpi ♂ pale at base; elytra convex, markings broad, not connected at margin; elytra punctate, more finely towards apex, not granulate, apices not serrulate; interocular striæ fine, numerous, reaching nearly to the labrum; front slightly hairy; last ventral ♂ symmetrically emarginate ..... **senilis.**

C. senilis Horn, 1866, Proc. Ac. Phil., p. 395; Schaupp, *l. c.*, p. 92, pl. 3, fig. 61. (This figure does not accurately represent the middle band.)
Length 12 mm.=.48 inch.

Habitat.—California, west of Sierra Nevada; Alameda Co.

Black, opaque, beneath green; elytral markings consist of humeral lunule, middle band, entering perpendicularly and arcuately bent

upward before bending rectangularly downward, and apical lunule; both lunules sometimes broken into dots. Head slightly hairy in front, granulate rugose; labrum obsoletely three-toothed or one toothed; thorax short, slightly narrowed behind, impressions deep, green at base, a few hairs on each side above; elytra black, tinged with green and coppery reflections, margins green; behind the humeri gradually broader, punctate more finely towards the base, apices not serrulate; beneath, the palpi, flanks of thorax, femora, coxæ, pleuræ and sides of abdomen are densely clothed with long white hair.

This species has had an unfortunate career in our collections, and is, perhaps, misrepresented in many at the present time. In Dr. Horn's own collection all the specimens under the label are not *senilis*. All the specimens from Inyo Co., which have been named *senilis*, are probably *pseudosenilis*. Prof. Schaupp gives the locality for *senilis* as "Cal. (San Diego), Nev., Utah," and there can be little doubt that his Utah specimens at least were *echo*. The true *senilis* has a limited range, and the specimens I have seen can be readily distinguished by the peculiarly heavy middle band bending arcuately upward as it leaves the margin.

The type of *senilis* is simply labeled "Cala," but identical specimens in Dr. Horn's collection, as I am advised by Dr. Henry Skinner, are labeled "San Rafael," which is in Alameda Co.

Bellissima group.

C. bellissima n. sp.

Length 10–12 mm.=.40–.48 inch.

Habitat. –Oregon, seacoast.

Head and thorax cupreous, with metallic green spaces on the head and in the impressions of the thorax, elytra dark metallic green, with coppery reflection and polished cupreous suture, or brown with cupreous suture; beneath green. Elytral markings broad, consisting of humeral lunule obliquely prolonged, middle band connected with marginal line, and apical lunule; the middle band enters perpendicularly, is bent at an obtuse angle and extends obliquely nearly to the suture. Head striate in front and between the eyes, not or scarcely hairy; labrum one-toothed; thorax slightly convex, almost quadrate, deeply impressed, sparsely hairy at sides; elytra uniformly granulate punctate, not serrulate at apex. Beneath, the palpi,

flanks of thorax, coxæ, pleuræ and legs are clothed with long white hair; shorter hairs, more sparsely placed, clothe the abdomen.

This species occurs on the seacoast of Oregon, at Yaquina Bay, where it has lately been collected by Prof. Wickham and by Prof. F. L. Washburn, of Eugene, Oreg. It has been sent out by Prof. Wickham and by myself as *hyperborea*, but erroneously as has since been shown by comparison with the types. It is possible that Dr. LeConte and Prof. Schaupp regarded the Oregon form as identical with *hyperborea* from Hudson's Bay Territory, but they differ, not only at first glance in the width of the markings, but in the pilosity of the head and the apical serrulation of the elytra, the characters which served to separate the species of the preceding group. The green specimens of this species are most brilliant objects under a strong glass and suggest the name assigned.

ANCOCISCONENSIS group.

Thorax convex, not margined, subquadrate; palpi ♂ pale at base; elytra convex, markings narrower, not connected at margin; front hairy, interocular striæ fine and numerous, labrum long, three toothed; elytra punctate-granulate, serrulate at apex..... **ancocisconensis.**

C. ancocisconensis Harris, 1853, Family Visitor (Cleveland, Ohio), 2, No. 39; Hald. Proc. Ac. Phil., vi, 361; Schaupp, *l. c.*, p. 93, pl. ii, fig. 47, pl. v, fig. 130.

Length 14–15 mm.=.56–.60 inch.

Habitat.—Vt., N. H., N. Y., Pa., Ill., Va.

Brown bronze, with cupreous or green reflections, sometimes dark green bronze, beneath green; elytral markings consist of humeral lunule, short middle band obtusely bent, apical lunule anteriorly reflected and a short marginal band connected with middle band. The markings resemble somewhat those of *repanda*. Head granulate, hairy in front, striate between the eyes only, labrum long and evidently three-toothed; thorax granulate, broad, not very convex, slightly narrowed behind, impressions deep, green at base, with a fringe of short hair each side above; elytra not strongly granulate, finely serrulate at apex; beneath, the palpi, flanks of thorax, sides of head, pleuræ, legs, coxæ and sides of abdomen are thinly clothed with long white hair.

Originally described from North Conway, N. H., in the White Mountains, this species is now found at Mt. Mansfield, Vt., by Mr Roland Hayward; on the road from Glen to Jackson, N. H., by

Mr. Bowditch, and on the banks of Cazenovia Creek, eight miles from Buffalo, N. Y., by Mr. Ottomar Reinecke. In the last locality the season is May and June and again in August. The date on my N. H. specimens is also June.

Vulgaris group.

Thorax convex, not margined, narrower behind; palpi ♂ bale at base; elytra convex, markings narrow, not connected at margin, humeral lunule much longer than usual, obliquely prolonged; front granulate, hairy; labrum three toothed; elytra granulate punctate, not serrulate at apex. **vulgaris.**

C. vulgaris Say, 1818, Trans. Am. Phil. Soc., new ser., i, 409, pl. 13, fig. 1; Lec. Ann. Lyc., iv, 179; Trans. Am. Phil. Soc., xi, p. 40; *tranquebarica* Herbst, Col., x, 178, pl. 171, fig. 12; Schaupp, *l. c.*, p. 94; pl. 3, fig. 52; pl. 6, fig. 131.

Length 11–17 mm.=.44–.68 inch.

Habitat.—(Including all varieties) Magdalen Islands, Quebec, Ontario, Manitoba, Me., N. H., Mass., Conn., N. Y., N. J., Pa., Md., N. C., Ga., La., Kan., Mo., Ky., Ohio, Ill., Wis., Iowa, Neb., Mont., Colo., Cal., Or., Wash.

Varies exceedingly and exhibits a tendency to develop into a large number of local races. Those which are more widely separated are as follows:

Black, humeral lunule entire ..... **vulgaris.**
Bright bronze, thorax cupreous, lunule entire ..... var. **horiconensis.**
Dull bronze, markings very broad ..... var. **obliquata.**
Bright green, humeral lunule broken ..... var. **vibex.**
Brilliant blue-green, humeral lunule lacking ..... var. **sierra.**
Dull green, humeral lunule broken ..... var. **roguensis.**

In addition to these there are other departures from the typical form. The humeral lunule is prolonged at a more or less obtuse angle, or is broken, or (in specimens from North Carolina) it nearly disappears; the middle band enters transversely in some specimens and quite obliquely in others; its extremity closely approaches the apical lunule in some, while it is widely separated in others; the apical lunule is rarely interrupted, but even this occurs in some specimens of *roguensis* and *sierra*. Some specimens are very hairy, while in others the hairs are far from conspicuous. The extraordinary variation in size is shown above.

C. vulgaris (typical).—Black above, dark green beneath; elytral markings, moderately wide, consist of humeral lunule obliquely prolonged, middle band

slightly expanded at margin, entering obliquely and bent at an obtuse angle, and an apical lunule, inflected in front. Head granulate and hairy in front, finely striate each side the eyes but not all the way between them; labrum evidently three toothed more acutely in females; thorax short, narrowed behind, impressions deep and scarcely colored at base; elytra gradually wider behind the humeri, punctate-granulate, not serrulate at apex. Beneath, the palpi, pleuræ, flanks of thorax, coxæ, legs and sides of abdomen are moderately hairy.

Var. **horiconensis** n. var.
Length 14–15 mm.=.56–.60 inch.

Habitat.—Lake George, N. Y.; Hamilton, Canada; Mt. Desert, Maine; N. Ill.; Wis.

Differs in color and in being more hairy. The head and thorax are cupreous above and beneath, the impressions of the thorax tinged with green; the elytra are cupreous, with the bases of the thickly placed punctures metallic green, producing an effect of green-bronze. Beneath metallic green, varied with cupreous on the pleuræ and legs. The color varies, and in some specimens the green shade is the more prominent, in others the cupreous, but in all there is a marked brilliancy of color that contrasts strongly with the black forms of the Pine Barrens of New Jersey and the races that inhabit the more southern States.

Var. **obliquata** Dej., Spec., 1825, i, 72; Kirby, Faun. Bor. Am., iv, 10; Schaupp, *l. c.*, p. 94.
Length 13–15 mm.=.52–.60 inch.

Habitat.—New Mex., Neb., Colo., Mont., Manitoba.

Differs in color, in the broader markings and in being more hairy. Greenish, cupreous or brown, beneath green. Humeral lunule broad, obliquely prolonged and almost touching the middle band; middle band broad, expanded at the margin to a variable extent, sometimes even connected with the lunules at the margin; apical lunule very broad.

Var. **vibex** Horn, 1866, Proc. Ac. Phil., p. 395; Schaupp, *l. c.*, p. 94, pl. 3. fig. 53.
Length 11–13 mm.=.44–.52 inch.

Habitat.—Or., Wash., Cal.

Bright green above and beneath; the humeral lunule usually interrupted and sometimes reduced to an oblique post-humeral dash. The specimens from San Bernadino Co., Southern California, are the most brilliant in color.

Var. **roguensis** Harris, 1901, Canadian Entomologist, xxxiii, p. 226.
Length 12-15 mm=.48-60 inch.

Habitat.—Gold Hill, Oregon; Kalispell, Mont.

Dark green, almost black in some specimens, thorax often shaded with cupreous; beneath green, pleuræ cupreous. Humeral and apical lunules usually interrupted. In the Montana specimens the remnant of the humeral lunule closely approaches the middle band as in var. *obliquata*.

Var. **sierra** n. var.
Length 12-13 mm.=.48-.52 inch.

Habitat.—Sierra Co., Cal.

Brilliant green above, and beneath with bluish reflections. Elytral markings very narrow and inconspicuous, consisting of humeral dot, very small, confined to the declivity and sometimes lacking, sometimes a short oblique line to represent the extremity of the humeral lunule, sometimes no trace of the lunule remains; middle band normal, usually very slender, sometimes reduced to a marginal dot; apical lunule usually interrupted.

Five specimens loaned by Mr. Charles Fuchs, of San Francisco, indicate that a race has developed in the Sierra Nevada, in which the tendency is towards a disappearance of the elytral markings. I cannot discover any differences beyond those named above, except that beneath the hairs are very sparse.

Repanda group.

Thorax less convex, even evidently flattened in some specimens, not margined, subquadrate or quadrate; palpi ♂ pale at base; elytra less convex, serrulate at tip, except in *depressula*, granulate-punctate, markings usually narrow, never entirely connected at margin, often reduced to dots; last ventral segment ♂ asymetrically emarginate.

Elytra ♀ suddenly dilated in front of the middle, elytra ♂ not dilated; humeral lunule upturned at lower extremity.

Elytra serrulate at tip.

Front hairy, or granulate punctate before the eyes.

Markings complete, not connected at margin..... **repanda.**

Markings partially connected, heavy ..... var. **unijuncta.**

Elytra ♀ gradually dilated; apex serrulate.

Front hairy or granulate-punctate.

Markings broken, form broader and flatter..... **12-guttata.**

Front not or scarcely hairy, striate in front of the eyes as well as between them.

Brown with complete uniform middle band..... **eureka.**

Markings usually broader, broken more or less into dots.

Brown, sometimes with greenish or cupreous shade (*guttifera* included as synonym) ..... **oregona.**

Head and thorax green, elytra violet-blue; violet beneath.
var. **maricopa.**

Elytra not serrulate at tip; front not hairy, striate nearly to the labrum; green above and beneath; humeral lunule usually lacking.
depressula.

Elytra ♀ ♂ dilated in front of the middle, elytra ♀ wider; humeral lunule upturned at its lower extremity.

Markings complete and partly connected at margin.

Brown-bronze with slender markings..... **hirticollis.**

Green-bronze with slender markings..... var. **gravida.**

Larger; brown-bronze with broader markings..... var. **ponderosa.**

In some of the forms of this group, the interocular striæ are plainly continued past the eyes and cover the entire front; such forms are not hairy in front. In other forms, while not as hairy as in *purpurea*, the front is hairy and the sculpture cannot readily be seen; in such forms, if the hairs are especially scanty, or if they have been removed by age or bad treatment, the punctures from which they grew are the more evident; and I have therefore used the phrase "front hairy or granulate punctate" to enable the reader to correctly place his specimen, no matter what its condition may be. I am indebted to Mr. Harris and to Mr. Fall's remarks in Entomological News (Vol. XII, pp. 307–310) for help in this group.

C. repanda Dej., Spec., 1825, i, 74; *baltimorensis* Lec. Trans. Am. Phil. Soc., xi, 43; *hirticollis* Say, Jour. Ac. Phil., i, 20; Gould, Bost. Jour., i, 49; Schaupp, *l. c.*, p. 94, pl. 3, fig. 62; pl. 6, fig. 132.

Length 12–13 mm=.48–.52 inch.

Habitat.—Canada, Mass., N. H., N. Y., N. J., Pa., Md., D. C., N. C., Ga., Fla., La., Ky., Kan., Mo., Wis., L. Sup., Manitoba, Colo., Ia.

Brown-bronze, with a more or less greenish or coppery reflection, beneath green; elytral markings consist of C-shaped humeral lunule, middle band rectangularly bent, apical lunule inflected anteriorly, and a marginal line connected with the middle and nearly reaching the lunules, but in eastern specimens, at least, never quite touching them. Head granulate, interocular striæ fine and close, front sparsely hairy, labrum short, one toothed; thorax nearly square, granulate, impressions deep, green at base, hairy at the sides above; elytra granulate punctate, serrulate at apex. Beneath, the palpi, flanks of thorax, sides of head, pleuræ, coxæ and legs are rather

thinly clothed with long white hair. The sides of the abdomen are also hairy, but inconspicuously so.

This species is widely distributed and very abundant. The sides of the elytra are subparallel in the male, suddenly dilated before the middle in the female.

Var. **unijuncta** Casey, *l.* c., p. 299.

Habitat.—El Paso, Tex.; N. Mex., Ariz.

This variety differs in having the white markings of the elytra broader and in having the humeral lunule and the middle band united by the marginal line. It is but feebly differentiated from *repanda*.

C. duodecim-guttata Dej., Spec., 1825, i, 73; Gould, Bost. Jour., i, 51, pl. 3, fig. 3; Lec., *l.* c., p. 42; Schaupp, *l.* c., p. 95, pl. 3, fig. 63; pl. 6, fig. 135; *proteus* Kirby, Faun. Bor. Am., iv, p. 9.

Length 12.5–15 mm.=.50–.60 inch.

Habitat.—Canada, Me., Conn., N. Y., N. J., Pa., Md., Va., Tex., L. Sup., Manitoba, Wis.; probably all the United States east of the Rocky Mts.

On account of the confusion regarding this species I have not used any localities outside my own collection and that of Mr. Harris and those recorded by Dr. LeConte.

Brown bronze, or sometimes coppery, greenish or blue; beneath green; elytral markings consist of humeral, posthumeral, apical and anteapical dots, and a very narrow middle band scarcely reaching the discal dot. Rarely a portion of the marginal line is visible behind and connecting with the middle band. Head and thorax as in *repanda*, except that the thorax is shorter and less convex; elytra gradually broader behind the humeri, granulate-punctate, serrulate at apex. Beneath the hairs are arranged as in *repanda*.

This species is commonly confused with *repanda* and *oregona*. From the first it may be separated usually by the absence of complete markings and always by the more flattened form, by the shorter and less convex thorax, and by the elytra of the female being only gradually dilated. From *oregona* it may be separated, as indicated by Mr. Fall, by the more evidently narrowed thorax and by the hairy front, as well as by the geographical distribution. The habits of the two species where they occur together, as in the Pine Barrens of New Jersey, are quite different. *Repanda* occurs in many situa-

tions on sandy roads, on the railroad tracks, in sandy fields, etc., while *12-guttata* is confined to paths through the cranberry bogs, blackened by vegetation and always damp, and to a few places where the wood paths, running across a stream, make gently sloping banks of blackened sand. The two species do not intermingle at this locality.

Dr. LeConte mentions "perfectly marked specimens, as well as those of a coppery and greenish color" from Lake Superior, and a specimen of a fine blue color, with very complete marks from Fort Gratiot, Mich.

C. eureka Fall, Ent. News, 1901, xii, p. 307.
Length 11–12.5 mm.=.44–.50 inch.

Habitat.—Humboldt Co., Cal.; collected by Dr. Edwin C. Van Dyke.

Dark brown, the elytra feebly, the head and thorax more evidently bronzed, and in part with green and coppery reflections; beneath blue green. Elytral markings consist of humeral and post-humeral dots, middle band not extending along the margin, narrow, obliquely bent and of nearly uniform width throughout, being but slightly dilated at its inner extremity, and apical and ante apical dots. Head striate between the eyes and in front of them nearly to the labrum, not hairy; labrum obsoletely three toothed; thorax nearly quadrate, granulate, impressions deep, metallic at base, scarcely hairy at sides above; elytra not suddenly dilated in ♀, punctate granulate, serrulate at apex, but only feebly so. Beneath, the hairs are arranged as usual in this group, but they are unusually sparse.

I am inclined to unite with this species the form occurring in Washington, which is entirely green. It has exactly the same marks as *eureka* and differs mainly in color and the absence of the serrulation of elytral apex.

I mention this form so that the description, which is taken from specimens kindly given me by Dr. Van Dyke, may not mislead in respect of color. This is, perhaps, the form of which LeConte had fragments (l. c., p. 41, No. 22).

C. oregona Lec., 1856, Trans. Am. Phil. Soc., xi, 41; *guttifera* Lec., *l. c.*, 42; Schaupp, *l. c.*, p. 94, pl. 3, fig. 64; pl. 6, fig. 133.
Length 9–14 mm.=.36–.56 inch (9 mm. is unusually small).

Habitat.—Col., Nev., N. Mex., Mont., Cal., Or., Wash., Vanc.; probably from the Rocky Mts. westwards.

Bronze brown, varying to dull cupreous in Colorado and to metallic green in California, the color always more evident on head and thorax, beneath bluish green and in part cupreous; elytral markings consist of humeral and post humeral dots, middle band, and apical and anteapical dots; the middle band enters perpendicularly, is bent obliquely and is quite unequal in width, its extremity being heavy and often disconnected. The elytral markings in *oregona* are often conspicuously broad. Head bald, finely striate between and in front of the eyes; labrum obsoletely three-toothed; thorax slightly narrower behind, flat, impressions deep, usually green at base, not hairy at the sides; elytra subparallel ♂, evidently broader ♀, but gradually so, not suddenly dilated as in *repanda*, granulate punctate, serrulate at tip. Beneath, the flanks of thorax, coxæ, pleuræ and legs are thinly clothed with white hair, the sides of abdomen very thinly clothed also. The greener specimens approach in appearance the peculiar form found at Phoenix, Arizona, which is called in many collections *guttifera* Lec., but the description of LeConte and the types in his collection do not support the practice, and *guttifera* must be regarded as a synonym.

Var. **maricopa** n. var.
Length 12–13.5 mm.=.48–.54 inch.

Habitat.—Phoenix, Arizona.

Similar to the preceding, except that the head and thorax are brilliant metallic green, while the elytra are dark violet, margins shining violet; beneath violet, metallic, shining. The elytral markings are similar to those of *oregona* and very heavy.

This is a geographical race of *oregona*, which has for a long time been separated in collections under the name *guttifera*, which was applied by Dr. LeConte to an insect corresponding with *oregona*.

C. depressula Casey, *l. c.*, p. 297.
Length 12–14 mm.=.48–.56 inch.

Habitat.—Cal. (Placer Co.); Oregon.

Green, head and prothorax in part with a coppery reflection; beneath green; the elytral markings consist of post-humeral dot, often lacking, middle band, apical and anteapical dots; the middle band is short, does not attain the margin, obliquely bent, narrow

and uniform in width. Head finely striate between and in front of the eyes, not hairy; labrum obsoletely three-toothed; thorax slightly convex, nearly quadrate, impressions deep, surface granulate, slightly hairy at sides; elytra punctate granulate, not serrulate at tip. Beneath, the palpi, flanks of thorax, coxæ, pleuræ and legs are thinly clothed with white hair, the sides of abdomen almost glabrous.

This species has been separated and nameless in collections for a long time. Major Casey has unfortunately compared it with *senilis* which it does not resemble, and he possibly had the Inyo County specimens of *pseudosenilis* in mind which have been called *senilis* in error.

C. hirticollis Say, 1818, Trans. Am. Phil. Soc., new ser., i, 411, pl. 13, fig. 2; *albohirta* Dej., Spec., ii, 425; Spec., v, 215; *unita* Kollar, Ann. Wien. Mus., i, 330; Schaupp. *l. c.*, p. 96, pl. 3, fig. 66; pl. 6, fig. 137.

Length 13–14 mm.=.52–.56 inch.

Habitat.—Atlantic seacoast, Gulf of Mexico coast, shores of the Great Lakes, banks of rivers in central and western States.

Bronze-brown, sometimes with green tinge; beneath green, very hairy; elytral markings consist of humeral lunule, middle band and apical lunule often all connected by the marginal line, though there is usually a break in front of the apical lunule. The humeral lunule is always bent upward at its posterior extremity, and by this char acter alone *hirticollis* may be separated. Head striate between the eyes, granulate and hairy in front; labrum one-toothed; thorax quadrate, flat, impressions deep, green at base, hairy at the sides, granulate; elytra suddenly dilated before the middle in both sexes, but wider in the female, granulate punctate, serrulate at apex. Beneath very hairy, the palpi, flanks of thorax, coxæ, pleuræ and legs thickly clothed with white hair, and the sides of the abdomen evidently clothed.

Var. **gravida** Lec., 1849, Ann. Lyc., v, 170; Chaud. Bull. Mosc., 1854, i, 113.

Habitat.—Seacoast of California, San Diego.

This is the form of *hirticollis* which inhabits the Pacific seacoast, and differs in being much more green than our eastern form. Dr. LeConte in 1856 considered it as identical with *hirticollis*, but the original types were preserved in his collection, and it is undoubtedly a geographical race.

Var. **ponderosa** Thoms., 1859, Arc. Nat., p. 89.
Length 14–15.5 mm.=.56–.62 inch.

Habitat.—Kan., N. Mex., Mex.

Differs from the typical *hirticollis* in the larger size, heavier markings, and more brilliant coppery or greenish color.

We have on the Atlantic seacoast specimens in which the markings disappear more or less. In the specimens before me a discal dot representing the end of the middle band, an apical lunule and some portions of the marginal band remain. I am doubtful whether this is even a race, and I assign no name to it, although it is quite generally separated in collections. I cannot discover that it differs in any respect from *hirticollis*, except in the disappearance of the elytral markings.

LIMBATA group.

Thorax slightly convex, not margined, subquadrate; palpi male pale at base; elytral markings broad or confluent making nearly white elytra; last ventral male asymetrically emarginate.
Front hairy, elytra serrulate at tip.
Markings confluent, elytra white ..... **limbata.**
Markings very broad ..... var. **hyperborea.**

C. limbata Say, 1823, Jour. Ac. Phil., iii, 142; Schaupp, *l. c.*, p. 93, pl. 3, fig. 55; *limbigera* G. and H. Cat., p. 20.
Length 12 mm.=.48 inch.

Habitat. Sand hills of Nebraska and Manitoba. Head and thorax green or cupreous; elytra white; suture, oblique line and dot or dots green or cupreous; beneath bluish green. Head striate between the eyes, granulate punctate in front and very hairy, the hair in well preserved specimens covering even the top of the head; thorax slightly convex, quadrate, very hairy, the hair in some specimens covering the thorax above entirely; elytra subparallel in male, broader in female, punctate only in the colored portion, serrulate at apex. Beneath very hairy, almost the entire body being thickly clothed with long white hair.

Box Butte, Nebraska, May and September; Imperial, Alliance, Frenchman's River, Neb.; Prof. Bruner found this species in "blow-outs" where there was little or no vegetation. Sand hills at Douglas, Manitoba. Aweme, Manitoba, Mr. Norman Criddle. This species seems to be confined to two widely separated localities, and I find no differences in the specimens.

Var. **hyperborea** Lec., 1863, S. M. C., 167, p. 1.
Length 11 mm.=.45 inch.

Habitat.—Methy Portage, Hudson Bay Territory; Mr. R. Kennicott. This locality is in 57° N. Lat., about 500 miles north of the boundary between U. S. and Canada.

Dr. LeConte's description is as follows: "Dark cupreous above, "front finely striate each side and sparsely pilose; thorax subquad- "rate, slightly convex, densely less slightly rugose, clothed with "white hair on the flanks, elytra a little wider behind the base, "granulate punctate, rounded and serrulate at apex, with a promi "nent sutural spine; humeral lunule obliquely prolonged behind, "middle band obtusely refracted and oblique behind, margin and "before the apex a little dilated, all broadly white; beneath green- "ish, shining, sides hairy, labrum short, one-toothed, labial palpi "with the next to the last joint pale in both sexes. Males with the "second joint of the maxillary palpi pale at apex."

The markings of the types in the LeConte collection are very broad, following the pattern of *bellissima*, and indicating that a further extension of the white would make the *limbata* marking. Owing to the inaccessability of the region where these specimens were collected, this is the rarest of Cicindelæ in collections. The specimens from Oregon, which Prof. Schaupp called *hyperborea*, are not that variety, but *bellissima*.

Tenuisignata group.

Thorax slightly convex, not margined, subcylindrical; palpi pale at base; front bald, striate to the labrum which is one toothed; elytra suddenly dilated in the female, uniformly punctured, serrulate at tip; elytral markings very slender, the middle band unusually prolonged. **tenuisignata.**

C. tenuisignata Lec., 1852, Ann., Lyc., v, 171; Trans. Am. Phil. Soc., xi, 44; Schaupp, *l. c.*, p. 97, pl. 3, fig. 67, pl. 6, fig. 142.
Length 10–12 mm.=.40–.48 inch.

Habitat.—The Needles, Cal.; N. Mex., Columbus, Tex., El Paso, Texas.

Brown-bronze, beneath metallic green; elytral markings very slender, consisting of humeral lunule curved, middle band slightly bent, oblique, very long, connected with a white marginal line, and apical lunule normal. The impressions of the thorax are not very deep, nor are they always green at base. Above, this species has a decumbent fringe of white hair on each side of the thorax; beneath

the entire body is thinly clothed with white hair, mostly decumbent. The tarsi of the male are pubescent beneath as usual, but very little wider than those of the female, and the last ventral segment is symetrically emarginate, otherwise this species might be placed in the *repanda* group.

Pusilla group.

Thorax slightly convex, subcylindrical not margined, palpi pale at base; front bald, striate to the labrum; elytra not serrulate, punctulate, sericeous.
Elytral markings almost or quite lacking ..... **pusilla.**
Almost black, all markings indicated ..... var. **pusilla.**
Almost black, markings reduced to apical lunule, or immaculate. var. **terricola.**
Blue or green, markings indicated or immaculate; punctures distinct. var. **cyanella.**

Elytral markings usually complete.
Middle band oblique.
Markings attaining or confluent on the margin ..... **cinctipennis.**
Markings separated from the margin ..... **imperfecta.**
Middle band perpendicular to the margin ..... **lunalonga.**

In addition to the characters used above, which seem the most obvious, *pusilla* may be known from *cinctipennis* and *imperfecta* by the more uniform sericeous surface and more convex thorax. The variety *terricola* seems to be very feebly differentiated, but I regret that I have not been able to see enough specimens to form a definite opinion. The differences between *cinctipennis* and *imperfecta* seem very constant and they have a different geographical range.

C. pusilla Say, 1817, Jour. Ac. Phil., i. 21; Trans. Am. Phil. Soc., new ser., i, 424, pl. 13, fig. 12; Dej. Spec., ii, 432; Lec. Ann. Lyc., iv, 183; Trans. Am. Phil. Soc., xi, 45; Schaupp, *l.c.*, p. 95; pl. 3, fig. 71.

Length 9-11 mm.=.36-.44 inch.

Habitat.—Platte River Valley, on moist mud; Devil's Lake, N. Dak. (Wickham); Ariz. (Blanchard); Kan., Neb., Dak., Hudson Bay Terr., Cal. (Schaupp).

"Opaque black, not metallic, head striate, thorax almost quadrate, slightly narrowed behind, rounded at the sides and hairy, elytra gradually wider behind the shoulders, sparsely punctate, with humeral lunule curved, apical lunule inflected anteriorly, and a median oblique streak dilated at the margin, all slender and white, beneath sparsely hairy at the sides; tibiæ pale at base; labrum white, tridentate; palpi of both sexes pale, blackish at apex. Varies with the elytra black immaculate." (LeConte.)

Var. **terricola** Say, 1824, Long's Exp., 268; Lec., *l. c.*, p. 61; Schaupp, *l. c.*, p. 95.
Length 10 mm.=.49 inch.

Habitat.—"North West Territory" (Say); Nebraska, H. B. T. (Schaupp); Baja California (Wickham); Cal. (Horn collection).

"Closely allied to *pusilla*, but the marking of the elytra differs, "and the thorax is not so much contracted at base, and is more "closely affixed to the abdomen."

"Black; a white line at the tip of the elytra; body destitute of "metallic lustre; labrum white, breadth more than twice the length, "tip three-toothed, intermediate tooth conic acute, the lateral teeth "angulated obtuse; mandibles white on the exterior base; thorax a "little hairy; elytra with scattered very minute punctures, which "are oblique, as if formed by a pointed instrument directed towards "the anterior part of the insect, so that the surface before each punc-"ture is a little elevated; a white line margins the extremity; ven-"ter blackish testaceous." (Say.)

Var. **cyanella** Lec., 1856, Trans. Am. Phil. Soc., xi, 46; Schaupp, *l. c.*, p. 95, pl. 3, fig. 72.
Length 9–10 mm.=.36–.40 inch.

Habitat.—Yellowstone River (Montana ?) was the locality from which the type was taken; Kan., Neb., Dak., Nev. (Schaupp).

"Dark blue, sericeous, head striate on both sides, thorax longer "than wide, sides slightly rounded, clothed with white hair, slightly "narrowed behind, elytra fuscous, gradually wide behind the humeri, "strongly punctate with blue, humeral lunule curved, apical lunule "inflexed in front, spot at middle short, close to the margin, but not "reaching it, more produced within; beneath, the sides are clothed "with white hair, tibiæ obsoletely testaceous at middle; labrum white, "short and subtridentate, palpi of males pale, with last joint black, "maxillary piceous at base. Differs from *pusilla* by the deep and "large punctures, and from *cinctipennis* in having the elytral form "and markings of *pusilla*." (LeConte.)

C. cinctipennis Lec., 1848, Ann. Lyc., iv, 182, pl. 14, fig. 12; Trans. Am. Phil. Soc., xi, 45; Schaupp, *l. c.*, p. 96, pl, 3, fig. 68, 69; pl. 5, fig. 138.
Length 9–12 mm.=.36–.48 inch.

Habitat.—Platte and Arkansas River, on muddy plains (Le. Conte); Neb., Kan., Mont., Col., Cal., Wash. (Schaupp); N. Mex. (F. H. Snow); Buena Vista, Col., July (Wickham); Winslow,

Ariz. (Wickham); Montana (Blanchard). The western localities cited by Schaupp are possibly doubtful, as the next species is the one usually found in Cal. and Wash.

Brown, green, blue or black, beneath green or black; elytral markings consist of white line on the submargin, separated from the margin by a narrow black stripe, dilated towards the apex, with narrow humeral and middle branch both descending obliquely, the latter sinuate; or they consist of oblique humule lunule, oblique middle band connected with a submarginal line and apical lunule; and rarely the markings are reduced to an oblique abbreviated humeral lunule, triangular submarginal spot and apical lunule; but always the narrow separation of the submarginal line from the margin is preserved. (It might be possible, with more material than I have, to separate these forms as geographical races, but at present I cannot do so.) Head striate to the labrum, not hairy; thorax with the sides slightly rounded, a little narrower behind, with a fringe of hair on either side; elytra subparallel, punctulate, sericeous, not serrulate at apex; beneath, the palpi, coxæ, pleuræ, flanks of thorax and sides of abdomen are sparsely hairy. Prof. Schaupp followed Dr. LeConte in describing the elytra as "strongly punctate," which is incorrect.

C. imperfecta Lec., 1849. Ann. Lyc., v, 171; Trans. Am. Phil. Soc., xi, 45; Schaupp, *l. c.*, p. 97, pl. 3, fig. 70; pl. 5, fig. 139, 140, 147 (the last should be *cinctipennis*).

Length 9–12 mm.=.36–.48 inch.

Habitat.—Sacramento, Cal. (LeConte); Or., Wash. (Blanchard); Cal., Or., Nev. (Schaupp); Idaho, Or., Wash. (Wickham). Prof. Wickham took this species abundantly early in June, along the banks of a small creek near The Dalles, Oregon, and again at Wenatchee, Wash., July 5th.

Differs from the preceding in the type of its markings and in geographical distribution. The middle band is always at a considerable distance from the margin. In one form the humeral lunule is long and oblique and connects with the middle band, which is also long and oblique, but does not touch the normal apical lunule. In the other form the markings are more slender and are all disconnected, long oblique humeral lunule, long oblique middle band not reaching the margin and normal apical lunule. Otherwise this species is identical with *cinctipennis*.

C. lunalonga Schaupp, 1884, Bull. Br. Ent. Soc., vi, p. 122.
Length 9.5–11 mm.=.38–.45 inch.

Habitat.—Sierra Co., Cal.; Tuolumne Co., Cal.

"Blackish bronze above; beneath, head and thorax brilliant "green, abdomen metallic blue, slightly hairy on the sternum. "Head glabrous, granulate, striate between the eyes; labial palpi "pale, with last joint dark; labrum short, with a distinct tooth at "middle; thorax glabrous, nearly quadrate, granulate, very slightly "narrowed behind; impressions very deep, greenish bronze; elytra "subparallel, granulate, finely punctured with a row of green foveæ "near the suture and several scattered foveæ near the humeri; tips of "elytra separately rounded with a short sutural spine. The markings "consist of a slender, very long humeral lunule running obliquely "to the middle of the elytra, reaching nearly to the suture, dilated "at tip; middle band not reaching the margin, arising from a trian- "gular spot, bent rectangularly at middle, descending somewhat "obliquely and hooked at tip; the transverse portion is heavy, but "the descending line is short and slender; apical lunule broad, "broadly indented anteriorly and less so posteriorly. Legs green- "bronze, stout, moderately long." (Schaupp).

Var. **tuolumnæ** n. var.
Length 11 mm.=.44 inch.

Habitat.—Hetch Hetchy Valley, Tuolumne Co., Cal.

Collected by Dr. Edwin C. Van Dyke and distributed in many collections as *terricola*.

Sericeous green above, beneath dark green. Elytral markings consist of narrow oblique humeral lunule, with a dot separated from its extremity, but in line with its prolongation; sinuate middle band entering transversely and expanded at the margin and at the extremity, but very slender at the middle; apical lunule strongly inflected anteriorly. Head glabrous, finely striate over most of the surface, eyes moderate, labrum moderate, truncate, feebly one toothed; thorax slightly convex, slightly narrowed behind, granulate, impressions moderate; elytra, commencing at basal third, become gradually wider to apical fifth, whence they are obliquely narrowed to apex; apices separated, rounded, not serrulate. Surface of elytra sericeous, not visibly punctate, excepting a few points in the vague subhumeral depression. Beneath, very sparsely hairy on flanks of thorax, sides of abdomen and legs. Palpi pale,

scarcely hairy. The locality where about thirty of this variety were found by Dr. Van Dyke is far from any town in the heart of the Sierra Nevada. It is closely allied to *pusilla* and comes very near *lunalonga*, the type of which has kindly been loaned by Mr. Fuchs, in its markings, but differs from it in color, in the form of the middle band, in size and in the form of its elytra.

Rectilatera group.

Thorax slightly flattened, subquadrate, alutaceous, not granulate or rugose. **rectilatera.**

C. rectilatera Chaud. Bull. Mosc., 1843, iv, 693; Schaupp, *l. c.*, p. 97, pl. 3, fig. 75; *texana* Lec., List. of Col.
Length 13–13.5 mm.=.52–.54 inch.

Habitat.—Tex., Mex.

Dark brown, beneath blue; elytral markings consist of five round white dots, one humeral, three submarginal and one discal, the apical lunule represented by one of the submarginal dots. Head glabrous, very finely striate; labrum one toothed; thorax almost quadrate, alutaceous, scarcely a trace of the usual transverse rugæ, a slight fringe of hair on each side; the impressions are shallow, greenish at base; elytra not deeply punctate, row of subsutural foveolæ indistinct, serrulate at apex. Beneath, the palpi, pleuræ, coxæ, legs, flanks of thorax and sides of abdomen are clothed with white hair.

"Abundant on river bars and sandy banks in southern Texas and "swarming about road pools between Alice and Brownsville, June "and July. I have very seldom seen any tiger beetles in such great "swarms as this." (Wickham).

Punctulata group.

Thorax subcylindrical, finely granulate; palpi pale at base; head bald, finely striate in front; elytra densely punctate with a subsutural row of unusually large foveolæ.

Form slender.

Black or dark bronze above, thorax always a little more metallic, markings incomplete ..... **punctulata.**

Brilliant metallic green above, thorax darker ..... var. **micans.**

C. punctulata Oliv., 1794, Ent., ii, 33, p. 27, pl. 3, fig. 37, a. b.; Fab. Syst. El., i, 241; Dej. Spec., i, 101; Say, Trans. Am. Phil. Soc., new ser., i, 420, pl. 13, fig. 11; Herbst, x, 180, pl. 172, fig. 2; Gould, Bost. Jour. Nat.

Hist. i, 54; Lec. Ann. Lyc., iv, 182; Trans. Am. Phil. xi, p. 53; Schaupp, *l. c*, p. 97, pl. 3, fig. 77, 76.

Length 10–13 mm.=.40–.52 inch.

Habitat.—Canada west to Manitoba, Me. to Fla., La., Tex., Col., N. Mex., Ariz., Ohio, Iowa, Wis.

Form slender, legs long; black, dark bronze or green-bronze above, head and thorax more metallic; beneath greenish blue; elytral markings variable, at the most consisting of an interrupted humeral lunule, an interrupted middle band connecting with a short marginal band and a complete apical lunule; usually the markings consist of a few minute white dots, and specimens rarely occur which are immaculate; head glabrous, striate in front; thorax subcylindrical, convex and slightly rounded at the sides which are sparsely hairy, very finely granulate; elytra finely serrulate at apex, densely punctured with a row of unusually large foveolæ near the suture which are often metallic at base. Beneath sparsely hairy on the usual parts.

Eastern and southern specimens are usually dark colored, and a race living in Louisiana is practically black above. The specimens from Col., N. Mex., Texas and Arizona are more brilliant approaching the next but never reaching its color.

Dr. LeConte's remark that this species is "frequently seen in the streets of our largest cities," has been often quoted, and is still as true as when printed in 1856. *Punctulata* seems partial to dusty roads, hard garden paths and the well-trodden roads of parks, and being a strong flier, it even invades the paved streets of down town New York, where I have personally seen it flying.

Var. **micans** Fab., 1801, Ent. Syst. Suppl. 61; Syst. El., i, 238; Lec., *l. c.*, Schaupp, *l. c.*, pl. 3, fig. 78.

Length 12–13.5 mm.=.48–.54 inch.

Habitat.—N. Mex., Ariz., Colo., Kan.

Brilliant green or blue, head and thorax sometimes bronze; larger but otherwise the same as *punctulata*.

Tortuosa group.

Thorax subcylindrical, rounded at the sides, scarcely narrowed behind, finely granulate, sparsely hairy; palpi pale at base; elytra with narrow markings, the middle band very tortuous..... **tortuosa.**

C. tortuosa Dej., 1825, Sp. Gen., i, 87; Lec. Ann. Lyc. 4, 181, pl. 14, fig. 10; Schaupp, *l. c.*, p. 98, pl. 3, fig. 73, 74; pl. 6, fig. 143; *trifasciata* Klug.,

Jahrb., i, 21; *ascendens* Lec., Ann. Lyc., v, 172; *serpens* Lec., *l. c.*, 173.
Length 11–13 mm.=.44–.52 inch.

Habitat.—Fla., Ga., Ala., La., Tex. Occurs on the seashore where it is too muddy for *dorsalis* and on the mud of rice fields.

Brown above, green or blue beneath; elytral markings are slender and consist of humeral lunule ending in a hook or lump, middle band very long and tortuous, forming an irregular **S**, apical lunule recurved anteriorly towards the suture and a supplementary marginal dot in front of the apical lunule. Head glabrous, finely striate in front of and between the eyes which are very large; labrum short, one toothed; thorax finely granulate, slightly rounded at sides and narrowed behind with a fringe of hair on each side; impressions shallow; elytra rounded and serrulate at apex; beneath, the palpi, coxæ, pleuræ, flanks of thorax, legs and sides of abdomen are hairy.

I cannot find any characters by which to separate *ascendens* and *serpens*, and I think they must be regarded as synonyms.

Var. **sigmoidea** Lec., *l. c.*, 1848, p. 172.
Length 11–13 mm=.44–.52 inch.

Habitat.—San Diego, Cal., on the seashore.

Differs in being usually greenish, with the thorax more distinctly granulate and the elytra more coarsely punctate.

Mr. Fall reports this variety as being very abundant on the beach, and Mr. Chas. Dury in a letter says of *tortuosa:* "along the sandy shore of Indian River, Fla.; swarming by thousands, April and May."

In the collection of Mr. Bowditch there is a specimen collected by Belfrage in Texas, which is very small (7 mm. long), and which presents some other differences, perhaps due to its unusual size. In the absence of more specimens I regard this as also included with *tortuosa*.

Dorsalis group.

Thorax flattened, broadest behind; palpi pale; elytra depressed, angulated before the middle ♀; right mandible ♂ armed with a tooth beneath.

Mandibular tooth long and acute.
Larger, markings narrower ..... **dorsalis.**
Smaller, markings broader ..... var. **media.**
Mandibular tooth short, obtuse.
Still smaller; markings broader yet ..... **Saulcyi.**

Immaculate specimens occur in all three forms.

C. dorsalis Say, Jour. Ac. Phil., 1817, i, 20; Trans. Am. Phil. Soc. i, 415; pl. 13, fig. 5; Gould, Bost. Jour. Nat. Hist., i, 47; Lec. Trans. Am. Phil., xi, p. 46; Schaupp, *l. c.*, p. 98, pl. 4, fig. 91, 92; *signata* Dej. Sp. Gen. i, 124; *semipicta* Casey, *l. c.*, p. 299.

Length 13-15 mm.=.52-.60 inch.

Habitat.—Atlantic seacoast from Martha's Vineyard south to New Jersey.

Male.—Anterior tarsi with first joint hardly dilated, third joint very perceptibly oblique; tips of elytra conjointly rounded; right mandible inferiorly dilated into a long tooth near the tip.

Female.—Elytra angulated laterally; thorax dilated posteriorly; tips of elytra separately rounded.

Head and thorax bronze, somewhat greenish, finely rugose; elytra white, suture bronze and with or without markings of fine bronze lines; beneath bronze, densely clothed with white hair; elytral markings consist of subhumeral spot or dash and two discal arcuate lines overlapping, but not touching at about the middle of the elytra; the bronze margin of suture is branched in front of the middle, and the branch sometimes connects with the subhumeral dash. Head not hairy, striate between and in front of the eyes which are very large; labrum large, white, unidentate; thorax flat, broadest behind, rounded at the sides, very hairy above, granulate, sculpture thereby concealed; elytra very minutely punctulate, more coarsely in the dark lines, very finely serrulate at apex. Beneath, very densely clothed with white hair, except the middle of the abdomen and pectus; legs very long.

Occurs in July in great swarms.

Var. **media** Lec., Trans. Am. Phil. Soc., 1856, xi, p. 47; Schaupp, *l. c.*, p. 99, pl. 4, fig. 93.

Length 11-13 mm.=.44-.52 inch.

Habitat.—Seacoast of Va., N. C., S. C., Ga., Fla.

Differs from the preceding in being smaller and in living further south. Dr. LeConte says: "the narrower and less rounded thorax "and the narrower elytra induce me to consider it as a separate "species."

C. Saulcyi Guérin, 1840, Rev. Zool., p. 37; 1841, p. 96; Lec., *l. c.*, p. 47, fig. 34; Schaupp, *l. c.*, p. 99, pl. 4, fig. 94.

Length 8-11 mm.=.32-.44 inch.

Habitat.—Shore of the Gulf of Mexico from Key West to Texas.

The tooth of the right mandible (♂) is smaller, approaching thereby the South American *nivea*, the size is even less than in *media*, the elytra are narrower in both sexes, the thorax is longer and less rounded on the sides, the bronze markings of the elytra are much broader, and the posterior one is frequently lobed and connected with the suture.

Hamata group.

Thorax flattened, slightly rounded at sides, nearly quadrate; right mandible ♂ toothed near the tip; elytra rounded at the sides, with the suture of ♀ retracted, apices separately rounded, serrulate; elytral markings include a supplementary basal dot.

Elytra ♀ not deflexed at tip; mandibular tooth of ♂ obtuse, feeble. . **hamata.**

Elytra ♀ deflexed at tip; mandibular tooth of ♂ moderately long, acute. **marginata.**

C. hamata Brullé, Arch. Mus., 1839, i, p. 132, pl. 8, fig. 9; Schaupp, *l. c.*, p. 99, pl. 4, fig. 79; *lacerata* Chaud. Bull. Mosc., 1854, i, 115; Lec. Trans. Am. Phil., xi, p. 48, fig. 35.

Length 11–12 mm.=.44–.48 inch.

Habitat.—Fla., Miss., La., Tex., on the shores of the Gulf of Mexico, June and August.

Brown or green bronze, beneath green-bronze, very hairy at the sides; elytral markings consisting of basal dot, humeral lunule, middle band refracted, with descending part confused, apical lunule and white wide margin connecting all the other marks; head clothed with short decumbent hair nearly to the occiput, striate near the eyes, granulate behind; labrum short, obsoletely unidentate; right mandible (♂) with a feeble obtuse tooth beneath; thorax quadrate or very nearly so, feebly rounded at the sides, flattened, granulate, clothed with short decumbent hair through which the sculpture is seen; elytra slightly rounded ♂, more strongly ♀, uniformly punctate, except in the white markings, serrulate at apex, the sutural margins very feebly drawn apart near apex in ♂, but very strongly in the ♀, in which sex the apices are also separately rounded. Beneath very hairy; the whole body, except at middle, and even the whole side of the head below the eye being thickly clothed with white decumbent hair. Legs very long, hind trochanters red.

C. marginata Fab., Syst. Ent., p. 226; Say, Trans. Am. Phil. Soc., new ser., i, p. 417, pl. 13, fig. 6; Lec., *l. c.*, p. 48, fig. 36; Schaupp, *l. c.*, p. 99, pl. 4, fig. 80; *variegata* Dej., Spec., i, 84.

Length 11–14 mm.=.44–.56 inch.

Habitat.—Mass., N. Y., N. J., Va., N. C., S. C., Ga., Fla.

July (near New York), April and June (Fla.). Occurs on mud flats along the coast.

Very close to the preceding from which it may be distinguished by the narrower white margin and by the longer manibular tooth in the male or the deflexed elytral apex in the female. The southern specimens are more perfectly marked.

CUPRASCENS group.

Thorax flattened, slightly rounded at sides, nearly quadrate; elytra with a basal white spot, sinuate at apex ♂, emarginate ♀ with a subapical tooth on the external margin, except in *blanda*.

Elytral markings broad, confused, the surface more than half white. **blanda.**

Elytral markings slender, not confused.

Middle band long and sinuous.

Subapical tooth ♀ acute and prominent; apex ♀ rounded, ♂ obtuse. **cuprascens.**

Subapical tooth ♀ rectangular; apex ♀ obtusely truncate, ♂ subacute. **puritana.**

Subapical tooth ♀ rather obtuse; apex ♀ slightly prolonged ♀ and ♂. var. **macra.**

Middle band short, terminated by a short hook ..... **Wapleri.**

Blanda is found in Ga. and N. C. on banks of rivers; *cuprascens* is found in Ky., Tex., Kan., Mo., Ark., Neb., Dak., on banks of rivers; *puritana* is found in N. Y., Conn., Mass., N. H., on banks of rivers; *macra* is found in Wis., Minn., Ia., Ill., Kan., on banks of rivers; *Wapleri* is found in Miss., La., on banks of rivers.

Blanda and *Wapleri* are readily distinguished; the other three are difficult to distinguish, doubtful cases occur and should be referred to *cuprascens*—the older name.

C. blanda Dej., 1831, Spec., v, 238; Lec. Ann. Lyc., iv, 138; Trans. Am. Phil., xi, 49; Horn, Trans. Am. Ent. Soc., 1876, p. 238; Schaupp, *l. c.*, p. 101; *tarsalis* Lec. Proc. Ac. Nat. Sci., vi, 66.

Length 11–13 mm.=.44–.52 inch.

Habitat.—Ga., N. C., on the banks of rivers.

Green bronze above, the elytra in great part white; elytral markings very broad, consisting of basal dot connected on the base with humeral lunule which is broad, and with a lumpy hook almost touching the basal dot again, a middle band, broad, sinuate and confused at its large extremity, an apical lunule very widely extended and a broad white margin connecting all the marks. "Apical

lunule entirely consumed by the broad white margin" is Dejean's expression. Head striate between the eyes, hairy to the occiput; labrum short, unidentate; thorax flat, granulate, thinly clothed with white hairs; elytra punctate, except in the white parts, sinuate at the apex, the sinuation forming a very blunt tooth or suggestion of a tooth in the ♀; beneath, densely clothed with white hairs, except at the middle, even to the head below the eyes; color dark green, shining, trochanters all rufous, tibiæ, palpi and tarsi pale; legs very long.

Very rare in collections. Not found recently.

C. cuprascens Lec., Proc. Ac. Phil., 1852, p. 65; *blanda* (var. B.) Lec., Ann. Lyc., iv, 180; Chaud. Bull. Mosc., 1854, p. 172; Horn, Trans. Am. Ent. Soc., 1876, p. 238; Schaupp, *l. c.*, p. 100, pl. 4, fig. 81.
Length 12–14 mm.=.48–.56 inch.

Habitat.—Ky., Kan., Mo., Ark., Tex., Neb., Dak., on the banks of rivers and on sand-bars.

Cupreous or greenish bronze above, shining; beneath green, trochanters all rufous; elytral markings follow the same pattern as in the preceding, but are much narrower. Other characters as in the preceding, except the sexual which are:

Male.—Elytra obliquely sinuate at apex, suture not retracted, tip obtuse.

Females.—Elytra emarginate externally at apex, with a subapical tooth acute and prominent; suture feebly retracted, tip rounded.

This species is widely distributed and has developed into geographical races which are difficult to distinguish, except by the sexual characters and the locality labels. The specimens taken by Mr. Charles Dury at Newport, Ky., on bottom lands are shorter and broader and indicate an undescribed race; as do also the specimens from Texas with very slender markings. In the absence of abundant material and in view of the difficulty of separating the varieties already described, I include these forms with *cuprascens*, where all doubtful specimens should be placed for the present.

Var. **puritana** Horn, 1871, Trans. Am. Ent. Soc., iii, 135; Trans. Am. Ent. Soc., 1876, p. 238; Schaupp, *l. c.*, p. 100, pl. iv, fig. 82.
Length 10–12 mm.=.40–.48 inch.

Habitat.—"N. Y." is a recorded locality not recently confirmed; on the banks of the Connecticut River from Claremont, N. H., to

South Windsor, Conn., June 20th to August 13th. Recently collected by Mr. C. Crozet of Hartfort, Ct.

Bronzed, elytra more finely and less densely punctured; elytra ♀ emarginate externally at apex, subapical tooth rectangular; tip obtusely truncate; elytra ♂ sinuate, tip subacute.

macra Lec., Trans. Am. Phil. Soc. 1856, xi, 50; Schaupp, *l. c.*, p. 100, pl. 4, fig. 83; Horn, Trans. Am. Ent. Soc., 1876, p. 238; *blanda*‡ Lec. Ann. Lyc., iv, 180

Length 12–14 mm.=.48–.52 inch.

Habitat.—Wis., Minn. (LeConte), Ill., Kan. (Schaupp), Iowa (Wickham).

"More slender than *cuprascens* and readily known by the elytra "being more than twice as long as wide, less strongly punctured "and not shining; the markings are of the same form, but nar- "rower, and the external angle of the obliquely sinuate elytra of "the female is obtuse or at most rectangular." (LeConte.)

Bronzed; elytra finely and sparsely punctured; elytra ♀ less emarginate, subapical tooth rather obtuse; tip slightly prolonged, suture spinous; elytra ♂ with tip slightly prolonged.

The characters given are quoted from Horn and LeConte, but after seeing specimens from Wisconsin I am unable to separate *macra* even as a variety. I have omitted this name from the list.

C. Wapleri Lec., Trans. Am. Ent. Soc., 1875, p. 158; Schaupp, *l. c.*, p. 101, pl. 4, fig. 84; Horn, Trans. Am. Ent. Soc., 1876, p. 239.

Length 9–10 mm.=.36–.40 inch.

Habitat.—Miss., La., May and June.

Recently collected by Mr. Hugo Soltau at Covington, La., "on "the snow-white sand banks of a little stream which flows through "a beautiful country covered with timber. They would dart around "more in the shade towards the sloping bank than close to the "water's edge."

Smaller than *cuprascens*; dark coppery above, dark green beneath, all the trochanters rufous; elytral markings consist of a basal dot and a broad marginal line, from which proceed a slender C-shaped humeral lunule and a hooked middle band; the apical lunule is scarcely distinguishable from the broad continuation of the marginal line; other characters and pubescence as in *cuprascens*, except the sexual characters; elytra ♀ less emarginate than *sperata*,

emargination limited by a short rectangular tooth, apices separately rounded; elytra ♂ strongly, obliquely sinuate, nearly conjointly rounded.

SPERATA group.

Thorax flattened, slightly rounded at sides, quadrate in the male, broader behind in the female; elytra ♀ emarginate at apex with a subapical tooth.
Elytra without basal dot.
Markings not connected at margin ..... **nevadica.**
Markings connected at margin.
Form stout, markings broad..... **Knausii.**
Form slender, markings narrow.
Base of thorax ♀ strongly protuberant..... **inquisitor.**
Base of thorax ♀ not protuberant..... **sperata.**

C. nevadica Lec., 1875, Trans. Am. Ent. Soc., v, 159; Horn, *l. c.*, p. 239; Schaupp, *l. c.*, p. 101, pl. 3, fig. 88 (markings are not broad enough).
Length 11 mm.=.44 inch.

Habitat.—Nevada, not recently collected.

Coppery bronze, beneath green; elytral markings very broad (for this group), consisting of humeral lunule slightly oblique, not hooked at tip, middle band with short, feebly sinuous longitudinal portion, apical lunule broad, not prolonged in front; head large, front sparsely hairy, labrum not distinctly toothed; thorax nearly cylindrical, finely rugose, sides hairy; elytral deeply not coarsely punctured; ♂ broadly subsinuate near the apex, ♀ emarginate near the apex, the anterior angle of the emargination rounded.

C. Knausii n. sp.
Length 10–12 mm.=.40–.48 inch; width 4–5 mm.=.16–.20 inch.

Habitat.—Salt marshes near Kackley, Belvidere, and Great Spirit Springs, Kansas, occurring in July on the wet mud near the water's edge of streams flowing through the marshes.

Rather stout, moderately convex, feebly shining, bronze in color, sometimes with greenish reflections on the elytra, underside and legs green, tibiæ, trochanters and anus paler; elytral markings broad and connected at margin, consisting of complete humeral lunule, obliquely descending and moderately hooked at tip, complete broad middle band narrowly separated at extremity from the suture and complete apical lunule prolonged toward base at both extremities; *head* broad, eyes very prominent, interocular striæ fine, frontal pilosity sparse and decumbent, labrum not evidently dentate, adorned with a row of setigerous punctures in front; *prothorax* longer than

wide, quadrate, densely clothed on the flanks with decumbent white hairs, sparsely hairy above, not protuberant at base; *elytra* oblong, sides moderately arcuate, apex oblique, slightly sinuate ♂, emarginate laterally ♀, the subapical angles rectangular; surface even, except for the slight subhumeral impressions, punctate, except in the white markings, with closely placed punctures, which, when microscopically examined, are themselves most minutely punctulate with metallic green or cupreous points, which cause a changing color as the insect is moved; beneath densely clothed with decumbent hair, except the middle of the abdomen, even the sides of the head below the eyes being covered.

This species resembles *sperata*, but is shorter and broader and much more heavily marked. The emargination of female elytral apex is similar to that of *sperata*, but the subapical angle is less acute.

This species was discovered by Mr. Warren Knaus of MacPherson, Kansas, and was mentioned by him as a variety of *sperata* (Can. Ent., p. 114) a year ago. It is with pleasure that I dedicate it to him as a testimonial of the high appreciation in which I hold the painstaking work he has done among the Kansas tiger beetles.

C. inquisitor Casey, 1897, *l. c.*, p. 298.
Length 12-14 mm.=.48-.56 inch.

Habitat.—Austin, Texas.

"Closely allied to *sperata*, but stouter, with a broader head, still "more prominent eyes and more protuberant sides of the prothorax "at the basal angles. The female has the external angulation near "the apex of the elytra rounded, while in *sperata* this angle is "acute, even inclining slightly backward at the extreme apex." (Casey).

My specimens are from Austin and correspond exactly with the description. The protuberant basal angles of the thorax are notably evident in the female and are a remarkable character on the existence of which I retain this species as distinct. Otherwise it would be difficult to separate it from *sperata*.

C. sperata Lec., 1856, Trans. Am. Phil. Soc., xi, 50; Horn, *l. c.*, p. 239; Schaupp. *l. c.*, p. 102, pl. 4, fig. 87.
Length 10-13.5 mm.=.40-.54 inch.

Habitat.—Rio Grande, N. Mex., Tex., Ariz., Cal. (Yuma), June and July.

Brown, brilliant cupreous, bright green or shades between them above, beneath green; elytral markings consisting of humeral lunule oblique, hooked at tip, middle band with long, moderately sinuous longitudinal portion, apical lunule inflected at both ends, anterior end moderately prolonged, all connected by a white marginal line; head and thorax clothed with white pubescence; thorax with sides slightly rounded, broader behind and slightly protuberant at basal angles in the female; elytra closely punctate, oblique at apex and serrulate; moderately sinuate near tip in the male, tip itself acute with a sutural spine; emarginate in the female, with a distinct sub apical tooth limiting the emargination, tip less prolonged than in male, but with sutural spine; beneath densely clothed with decumbent hair, except in the middle, even the sides of head hairy; legs very long, trochanters rufous; palpi pale; labrum short, one toothed. Prof. Wickham has found the cupreous, green and brown forms flying together at Luna, N. Mex.

Gabbii group.

C. Gabbii Horn, 1866, Proc. Ac. Phil., p. 395; Schaupp, *l. c.*, p. 102, pl. 4, fig. 89. Length 11–12 mm.=.44–.48 inch.

Habitat.—"On the mud of salt marshes at San Diego and Wil-"mington, So. Cal., in August and September, and rarely taken on "the ocean beach." (Fall.)

Olivaceous bronze, beneath green-bronze; elytral markings consisting of humeral lunule obtusely bent and hooked at tip, middle band curving towards the base and suddenly bent at an obtuse angle and obliquely prolonged towards the suture and continued nearly to the apical lunule, which is anteriorly very greatly prolonged, all connected by the marginal line; head finely striate in front and between the eyes, granulate behind; labrum short, one-toothed; thorax wider than long, rounded at the sides, granulate, hairy at the sides; elytra closely, coarsely punctured, conjointly rounded at tip, not sinuate ♂; separately rounded at tip, obliquely narrowed, scarcely sinuate ♀; serrulate in both sexes; beneath, the palpi, pleuræ, coxæ, legs and sides of abdomen are hairy, but the head is not; palpi and hind trochanters pale.

Hirtilabris group.

Cylindrical, very slender species; anus green; palpi pale; very hairy, abdomen pubescent even at middle; elytra sinuate at apex, more deeply in the female.

Labrum densely clothed with white hair..... **hirtilabris.**
Labrum glabrous.....**gratiosa.**

C. hirtilabris Lec., Trans. Am. Ent. Soc., 1875, v, 161; Horn, *l. c.*, p. 239; Schaupp, *l. c.*, p. 102, pl. 4, fig. 96.
Length 9–10 mm.=.36.–.40 inch.

Habitat.—Florida, sandy roads through meadows; July to Sept. New Symrna, Fla., May 6, Mr. Charles Dury.

Bronzed brown; elytra with a broad white border, feebly dilated in the region of the humeral lunule, middle band broad, marked with numerous dark points and lines, immediately behind it is a dilation representing the apical lunule; there is also a small basal spot. Body beneath, prothorax above and beneath, head above and beneath the eyes clothed with decumbent white hair; labrum indistinctly unidentate and also clothed with decumbent white hair. Elytra strongly punctured in the dark spaces, ♂ feebly sinuate, tip obtuse, ♀ more deeply sinuate, the sinuation limited in front by a distinct angulation, tip obliquely truncate.

C. gratiosa Guérin, Rev. Zool., 1840, p. 37; Lec. Trans. Am. Phil., xi, p. 59; Horn, *l. c.*, p. 240; Schaupp, *l. c.*, p. 103, pl. 4, fig. 95.
Length 10–12 mm.=.40–.48 inch.

Habitat.—S. C., Ga., Fla., Ala. Taken by Mr. Soltau, running over sand in the hills covered with scrub oak, at Spring Hill, Mobile, Ala.

Brown bronzed; elytra white, the suture brown-bronze, dilated at base, with two sharply defined branches on each side. Head and thorax densely clothed above and beneath with white hair, the latter elongate cylindrical, with two subglabrous dorsal vittæ; elytra obliquely subsinuate in male, more deeply sinuate in the female, very finely serrulate at apex; beneath densely pubescent; antennæ and legs very long, claws large; labrum short, slightly advanced in the middle, obsoletely unidentate; trochanters rufous. Very close to the preceding, from which it is distinguished by the glabrous labrum and the sutural dark space and branches narrower.

Lepida group.

Flat and broad; very hairy, but less so at the middle of the abdomen; elytra sinuate at apex, more deeply in ♀; anus testaceous, legs pale, sutural margin of elytra pale .....**lepida.**

C. lepida Dej., 1831, Spec., v, p. 255; Lec. Ann. Lyc., iv, 181, pl. 13, fig. 8; Trans. Am. Phil., xi, p. 51; Schaupp, *l. c.*, p. 103, pl. 3, fig. 90.
Length 9-12 mm.=.36-.48 inch.

Habitat.—Rockaway Beach and Long Branch, N. Y. (Harris); Trenton, N. J. (Leconte); Jamesburg, N. J. (Davis); Avalon, N. J., Pierpont, N. J. (Kemp)); Shawnee and Riley Co., Kan. (Popenoe); Neb. (Bruner); Iowa City, Ia. (Wickham); N. Mex., Topeka, Kan.; Lawrence, Kan.; Manhattan, Kan. (Knaus), Aweme, Manitoba (Criddle). This species is found on very white sand, such as is seen forming sand hills near the ocean, but inland as well as by the seashore. It is also attracted by electric lights.

Head and thorax green-bronze, hairy; elytra white, glabrous, dispersedly punctured with a few green or brown bronzed dark lines; suture pale; beneath green-bronze, densely clothed with white hair, which is much thinner or absent at the middle of the abdomen; anus testaceous; legs, antennæ and palpi pale, the latter darker at tip; labrum unidentate; elytra male scarcely sinuate, obliquely narrowed at apex, female sinuate, anteapical angle obtuse, not rounded, apex nearly truncate, not serrulate.

Togata group.

Thorax rounded on the sides; palpi pale; middle tooth of mandibles smaller than the others; apex of elytra acuminate ♂, separately rounded ♀ with suture retracted; densely hairy beneath even to the head; anus testaceous..... **togata.**

C. togata La Ferté, Rev. Zool., 1841, p. 40; Lec. Trans. Am. Phil., xi, p. 58; Schaupp, *l. c.*, p. 104, pl. 4, fig. 100.
Length 10-12.5 mm.=.40-.50 inch.

Habitat.—Neb., Kan., Tex., on saline flats, June to August.

Brown cupreous, with slight green tinge, beneath green, densely pubescent at the sides; elytral markings consist of white margin very broad, three lobed, so as to leave only a sutural broad greenish cupreous space; head cupreous, sparsely hairy above and in front; labrum one-toothed; thorax subquadrate, impressions shallow, sparsely hairy above; elytra flat, ovate in ♀, apex separately rounded, subparallel ♂, apex slightly acuminate, coarsely punctured and with a row of cupreous punctures near the suture often indistinct. Beneath, the sides of the head, flanks of thorax, sides of abdomen, palpi, legs and pleuræ are densely clothed with decumbent white hair; palpi, trochanters and anus pale.

Var. **apicalis** Walther Horn, 1897, Ent. Nach., xxiii, p. 17.
Length 11.2-12.5 mm.=.45-50 inch.

Habitat.—Kackley, Kansas, collected by Mr. Warren Knaus Differs from *togata* by its greater size, more robust form, eyes less prominent, and by the apex of the ♀ elytra being much less rounded, while that of the male is more acuminate.

Pamphila group.

Thorax rounded at the sides, hind angles prominent; palpi pale; apex of elytra slightly prolonged, conjointly rounded ♀, with a sutural spine ♂; densely hairy beneath even to the head; anus testaceous. **pamphila.**

C. pamphila Lec., 1873, Proc. Ac. Phil., p. 321; Chaud. Cat. Coll. Cic., 1865, p. 28, No. 130 (only the name).
Length 10.5-11 mm.=.42-.44 inch.

Habitat.—La., Tex., along the beach on dirty ground, where the great salt marshes open to the sea. Prof. Wickham found it abundant at Point Isabel, Tex., during June and the early part of July.

Olivaceous opaque above, beneath brilliant green; elytral marking consisting of very broad white margin, humeral lunule protruding but little, middle band long, oblique, nearly reaching the suture, hooked at tip, apical lunule with its anterior portion cutting deeply into the dark sutural space. Head green, shining, bald, striate between and in front of the eyes, granulate on occiput; labrum white, one-toothed; thorax granulate, rugose, hairy above, slightly convex, sides rounded, feebly constricted behind, hind angles rectangular, prominent; elytra strongly punctured, except in the white spaces, not serrulate at tip, which is slightly prolonged and has a sutural spine in the male and is equally rounded in the female. Beneath, the sides of the head, flanks of thorax, sides of abdomen, pleuræ, legs, palpi and coxæ are clothed with white decumbent hair. Eyes very large and prominent, legs very long and slender, anus and trochanters testaceous.

Circumpicta group.

Thorax rounded at the sides; palpi pale; apex of elytra conjointly rounded ♂, separately rounded ♀; hairy beneath, the sides of the head and the middle of the abdomen glabrous; trochanters purplish, markings connected at margin ..... **circumpicta.**
Middle band obliquely prolonged ..... var. **prætextata.**
Markings not connected at margin ..... var. **californica.**

C. circumpicta La Ferté, Rev. et Mag. Zool., 1841, p. 39 and 143; Lec., *l. c.*, p. 58; Schaupp, *l. c.*, p. 104, pl. 4, fig. 101, 102; *Johnsoni* Fitch, New York Agr. Soc., 1856, p. 487.

Length 11–14.5 mm.=.44–.58 inch.

Habitat.—Tex., N. Mex., Ariz., Neb., Kan. Mr. Knaus finds this species on salt marsh, in June, July and less commonly in August, in the vicinity of Fredonia, Kansas. It is most abundant near the waters edge, where the bare saline ground is moist and warm, and in sheltered offshoots where the sun shines hottest.

Green, blue, cupreous, brown or almost black above; beneath dark green bronze, densely pubescent at the sides; elytral markings consist of a broad white margin, more or less lobed internally to indicate the posterior part of the humeral lunule and the beginning of the middle band and the anterior part of the apical lunule. In the race inhabiting S. W. Texas the color is very dark and the middle band is represented by an oblique line connected with the margin, as is *Schauppii*. Head striate between and in front of the eyes, granulate on the occiput, not hairy; labrum three-toothed; thorax very shining and strongly rounded at the sides, feebly rugose, with a fringe of hair on each side apparent in well-preserved specimens; elytra parallel, strongly punctured, especially towards the base, conjointly rounded ♂, separately rounded ♀, serrulate at apex; beneath, palpi, pleuræ, legs, flanks of thorax and sides of abdomen are clothed with decumbent pubescence; legs long, palpi pale, trochanters purplish, anus usually testaceous.

Var. **prætextata** Lec., 1854, Proc. Ac. Phil., vii, 220; Trans. Am. Phil., xi. p. 58; Schaupp, *l. c.*, p. 104, pl. 4, fig. 104 (this figure does not represent middle band correctly).

Length 14–14.5 mm.=.56–.58 inch.

Habitat.—Tex., N. Mex., Ariz., Utah.

Differs in the shape of the middle band, which starts immediately behind the humeral lunule and runs obliquely until it almost touches the apical lunule, the anterior portion of which is also somewhat prolonged.

Var. **californica** Men., 1844, Bull. Ac. Petr., II, p. 52; Lec. Trans. Am. Phil. Soc., xi, p. 44 and p. 62 (figure); Schaupp, *l. c.*, p. 104.

Length 14 mm.=.56 inch.

Habitat.—San José del Cabo, Cape region of Lower Cal. In this variety the color is dark bronze and the marginal line is interrupted in front of the apical lunule. The connection between the humeral

lunule and the marginal line is also very slender and may be interrupted in some specimens. The middle band is straight, oblique and of uniform width throughout.

Dr. Horn identified specimens of this variety as *prætextata* under which name it is found in some collections; the insertion of the name *prætextata* in Mr. Fall's list of the beetles of So. Cal. is based upon this erroneous determination and it should read *californica*.

I include with *californica* provisionally the specimens from S. W. Texas, which have a similar middle band, although the marginal line is entire. Dr. Horn has pointed out that the fauna of the Cape region is allied to that of Mexico and Cent. Amer., and *californica* is apparently the extreme form of *circumpicta* in the direction on which these Texas forms have started.

SEVERA group.

Thorax convex, sides rounded; interocular striæ few and very coarse, head behind and between them finely wrinkled; elytra ♂ convex, ♀ much flatter.
Thorax almost smooth ..... **severa.**
Thorax transversely strigose, deeply so at sides ..... **striga.**

C. severa La Ferté, 1841, Rev. Zool., p. 41; Lec., *l. c.*, p. 58; Schaupp, *l. c.*, p. 105, pl. 4, fig. 98, 99.
Length 12.5–17 mm.=.50–.68 inch.

Habitat.—Fla., La., Tex., N. Mex. Prof. Wickham records the occurrence of this species at Point Isabel, Texas, on the beach with *pamphila*. It is, he says, "a most extremely wary species, of very "strong, swift flight, and was met with rarely. It flies in the hot- "test sunshine."

Dark green or almost black, beneath green; elytral markings consist of a white submarginal dot and a complete apical lunule. In some specimens there is an additional submarginal white dot, representing the terminal part of the humeral lunule. Head nearly polished, deeply striate beside the eyes, striæ few in number and coarsely cut; between them and behind the eyes the head is finely wrinkled, not hairy; labrum three-toothed; thorax scarcely rugose at the sides, almost polished, convex, rounded at the sides, slightly constricted behind, impressions not very deep; elytra near base sparsely but strongly punctured, towards the apex more obsoletely, with a row of foveolæ near the suture, apex serrulate; elytra con-

vex ♂, flattened ♀; beneath, the palpi, flanks of thorax, sides of abdomen, legs, pleuræ and coxæ are densely clothed with white decumbent hair; palpi pale, trochanters purplish, anus somewhat paler.

C. striga Lec., 1875, Trans. Ent. Soc., v, 161; Schaupp, *l. c.*, p. 105.
Length 13.5–16.5 mm.=.54–.66 inch.

Habitat.—Fla. Taken by Hubbard and Schwarz at night near camp fires at Lake Harney, near Enterprise. May.

Dark green or greenish black above and beneath; elytral markings consist of submarginal dot and apical lunule. Head smooth and glabrous in front, with a few coarse striæ beside each eye, wrinkled on the occiput, the wrinkles interrupting the continuity of some of the interocular striæ; thorax almost cylindrical, constricted behind, coarsely transversely rugose, the rugæ variable in depth in different individuals, impressions not deep; elytra subparallel, conjointly rounded ♂, coarsely not closely punctate and bearing a vague longitudinal impression in which is a row of foveæ. The punctures become obsolete at the sides in the apical region. Beneath, the flanks of the thorax, sides of abdomen, palpi, pleuræ and coxæ are sparsely hairy.

This species resembles *severa* more in description than it does in fact. It is more slender and less hairy and easily separated by the transverse rugæ of the thorax, which, in some large specimens, are very deeply graven.

Lemniscata group.

Small, cylindrical, brilliant cupreous, legs red; thorax cylindrical, convex; head striate to the labrum; eyes very large; palpi pale; elytra conjointly rounded ♂, separately rounded ♀ ..... **lemniscata.**

C. lemniscata Lec., 1854, Proc. Ac. Phil., vii, p. 220; Trans. Am. Phil. Soc., xi, p. 59; Schaupp, *l. c.*, p. 103, pl. 4, fig. 97.
Length 7.5–8 mm =.30–.32 inch.

Habitat.—El Paso, Tex., Ariz., N. Mex.. June to Oct. Prof. Wickham found this species abundantly at Tucson, Ariz., in Aug., running by the sides of the railroad.

Shining cupreous, beneath bluish green; elytral markings consist of a white longitudinal stripe far removed from the margin, slightly lobed internally, extending from the base to the tip where it bends around to the suture. Head rather coarsely striate from the labrum to the eyes, granulate behind the eyes, cupreous variegated with

green; thorax cylindrical, granulate, with a fringe of white hair on either side, impressions moderate, green at base; elytra granulate, parallel, serrulate at apex, which is separately rounded in ♀; beneath, the palpi, coxæ, pleuræ, legs and sides of abdomen are densely clothed with decumbent white hair, but the flanks of the thorax are glabrous (by which character alone this species might be separated); palpi pale, legs red; trochanters and anus pale. The labrum is large and emarginate at middle.

This species presents so many points of difference that it might even be set apart as representing a different genus.

Viridisticta group.

Subcylindrical, small, opaque brown cupreous with green foveæ; head finely striate; palpi pale; legs, in part, pale; sericeous above, almost glabrous beneath..... **viridisticta.**

C. viridisticta Bates, 1881, Biol. Cent. Am., part 1, p. 14, pl. 1, fig. 20; Schaupp, *l. c.*, p. 103.

Length 6.5–14 mm.=.26–.28 inch.

Habitat.—Arizona. Collected in 1893 by H. K. Morrison, and recently by Prof. Wickham. Occurs also in Mexico.

Head brown cupreous, finely striate in front and between the eyes, punctulate behind, glabrous; thorax cylindrical, granulate with a fringe of hair on either side; elytra subparallel, brown cupreous, with distant coarse green punctures and an irregular row of larger green foveæ; white markings consist of apical lunule, short middle band, sinuate, not reaching the margin, sometimes reduced to a triangular spot, and a post humeral spot, sometimes lacking, lateral margin broadly polished. Beneath polished blue, trochanters, palpi, tibiæ and tarsi pale, scarcely hairy.

Rufiventris group.

Abdomen red; labrum one toothed; palpi pale; head not hairy, very finely striate all over; elytra conjointly rounded in both sexes; surface sericeous; a fringe of hair on each side of the thorax above; sparsely hairy beneath on flanks of thorax, pleuræ, sides of abdomen, legs and palpi; elytral markings, when complete, include humeral lunule, middle band, apical lunule and additional spots between the middle band and the apical lunule.

Greenish black, middle band long and obliquely sinuate.. **hæmorrhagica.**
Greenish black, immaculate or nearly so..... var. **pacifica.**

Middle band short and nearly transverse.
Blackish brown, spots small ..... **rufiventris.**
Blackish brown, spots large.
Middle band reaching margin ..... var. **Henfzii.**
Middle band not reaching margin ..... var. **16-punctata.**
Blue, spots small or lacking ..... var. **cumatilis.**
Cupreous, spots large ..... var. **arizonæ.**

C. hæmorrhagica Lec., 1849, Ann. Lyc., v, 171; Chaud. Bull. Mosc., 1854; Lec., Trans. Am. Phil., xi, p 55; Schaupp, *l. c.*, p. 105, pl. 4, fig. 108, 109.
Length 10-16 mm.=.40-.64 inch.

Habitat.—So. Cal., Utah, Nev., N. Mex., Ariz. Occurs on dark sand along the bay beach at San Diego and on alkaline flats in April and May and in San Bernardino Co., Cal., and at a number of stations in the other States named.

Greenish black, sericeous above, black beneath, abdomen red; head and thorax and beneath sometimes more metallic; elytral markings consist of humeral lunule, broken or entire, middle band sinuate, descending obliquely and often broader at its extremity, supplementary marginal and discal dots and apical lunule; sometimes there is a short marginal line connected with the middle band and sometimes the supplementary discal dot is connected with the apical lunule. Head very finely striate all over, not hairy; thorax subquadrate, impressions not deep, surface feebly sculptured, a feeble fringe of hair on each side; elytra very faintly punctulate, conjointly rounded at apex, which is finely serrulate; beneath, palpi and trochanters are pale.

Var. **pacifica** Schaupp, 1884, *l. c.*, p. 106, pl. 4, fig. 110.
Length 13-15 mm.=.52-.60 inch.

Habitat.—Southern California; found along fresh water streams at San Diego and San Bernardino; on the ocean front at Del Mar (Fall).

"Differs from *hæmorrhagica* only by the color of the elytra which "are olivaceous, opaque greenish or bluish; head, thorax, margin, "suture and apex of the elytra more shining, no markings at all." (Schaupp.)

C. rufiventris Dej., 1825, Spec., i, 102; Lec., Trans. Am. Phil., xi, 56; Schaupp, *l. c.*, p. 106, pl. 4, fig. 112, 113.
Length 8-12 mm.=.32-.48 inch.

Habitat.—N. J., Md, D. C., Va., W. Va., N. C., Ala., Ky.

This species is very local in its habits, and the area in which it

occurs is liable to be very limited in extent. This is well illustrated by its distribution in New Jersey. In spite of the large number of New York and Philadelphia collectors who hunt in New Jersey, *rufiventris* remained undiscovered until my friend, Dr. William T. Davis found it in July, two years ago, on the East Plains, a desert tract of stunted pines and oaks, near Brookville, about ten miles inland from Barnegat. In Kentucky, Mr. Charles Dury has found it on "knobs" near Danville and at Cattletsburg in July. In Virginia, it has been found at Lanexa in July and in Bath Co., in the western mountains, in September. Dr. LeConte says it is found in the Alleghany Mts. from Md. to Ala.

Dark brown, bronzed above, bluish green beneath, abdomen red; elytral markings consist of humeral and posthumeral dots, short, transverse, sinuate middle band, sometimes broken, supplementary marginal dot, supplementary discal dot and apical lunule, usually entire. These markings are often partly lacking and are never large. Otherwise it is very similar to *hæmorrhagica*.

Var. **cumatilis** Lec., 1852, Ann. Lyc., v, 172; Trans. Am. Phil., xi, p. 56; Schaupp, *l. c.*, p. 106, pl. 4, fig. 115; *Guexiana* Chev. Mag. et Revue de Zool., 1852, p. 424.

Length 9–12 mm.=.36–.48 inch.

Habitat.—Ala., La., Texas. Recently collected by Mr. George Coverdale, Vowell's Mill, Nachitoches Parish, La. August.

Blue above and beneath, abdomen red; elytral markings the same as in *rufiventris*, but there is a strong tendency in the markings to disappear, and I have received from Mr. Coverdale specimens in which only the apical lunule remained.

Var. **Hentzii** Dej., 1831, Spec., v, p. 428; Lec. Ann. Lyc., iv, p. 182; Trans. Am. Phil. Soc., xi, p. 55; Schaupp, *l. c.*, p. 106, pl. 4, fig. 114; *hæmorrhoidalis* Hentz, Trans. Am. Phil. Soc., new ser., iii, 254, pl. 2, fig. 2; Gould, Bost. Jour., i, 52, pl. 3, fig. 5.

Length 10–13 mm.=.40–.52 inch.

Habitat.—Mass. Discovered by Dr. T. W. Harris on the summit of Blue Hill, Milton, Mass., and occurs also in Medford, Gloucester, Brookline, West Roxbury and Malden. June to August. Recently collected by Mr. L. E. Hood of Somerville, Mass. Dr. Gould says "It does not prefer the sand and the plain, but its habit is to bask "on the broad flat masses of granite which rise above the soil, re- "tiring to the patches of moss and lichen which vegetate in the

"crevices. When flying in the sunshine its crimson and nearly "transparent abdomen appear like a drop of blood suspended to its "tail.

Color almost black, the two dots of the humeral lunule sometimes connected at the margin; the middle band reaches the margin and is dilated into a short marginal line which extends forward; the supplementary marginal spot is sometimes connected also with this line; the under surface is blue and green.

Var. **16-punctata** Klug, 1834, Jahrbuch für Insectenkunde, p. 32; Lec., *l. c.*, p. 56; Schaupp, *l. c.*, p. 106, pl. 4, fig. 111.
Length 10–13 mm.=.40–.52 inch.

Habitat.—Western Texas, N. Mex., Ariz. Recently collected by Prof. Wickham on the shores of the Rio Grande at Albuquerque, N. Mex., flying about muddy flats. Very similar to the preceding; the middle band does not extend to the margin and is frequently separated into two dots, so that each elytron has eight dots.

Var. **arizonæ** Wickham, 1899, Proc. Davenport Acad. of Nat. Sci., vii, p. 226.
Length 11 mm.=.44 inch.

Habitat.—Canon of the Colorado River, in Arizona. July. Collected by Prof. Townsend on sandy places or along paths by a stream going down a side canon from Hance's Stone Cabin (2500 feet above the river and 2500 feet below the rim) to the level of the Colorado River.

Reddish bronze above, with greenish reflections, bronzed beneath, with the same reflections, trochanters and abdomen rufous, legs cupreous; elytral markings consist of complete humeral lunule, middle band not or very slightly extended on the margin, obliquely bent, not much narrowed at any part; supplementary dot small, and apical lunule entire. More hairy beneath than any other variety.

MARGINIPENNIS group.

Abdomen red; palpi pale; head not hairy; very finely striate all over the upper surface; elytra conjointly rounded in both sexes; surface sericeous; a fringe of hair on each side of the thorax above; sparsely hairy beneath; elytral markings a marginal line with branches indicating the lunule.
Labrum short, elytra not foveate ..... **marginipennis.**
Labrum longer, elytra with green foveæ ..... **Schauppii.**

C. marginipennis Dej., 1831, Spec., v. 260; Laf. Rev. Zool., 1841, p. 193; Lec. Ann. Lyc., iv, 182, pl. 14, fig. 11; Trans. Am. Phil. Soc., xi, p. 57; Schaupp, *l. c.*, p. 107, pl. 4, fig. 107.
Length 11–14 mm.=.44–.56 inch.

Habitat.—N. Y., Pa., Ohio. On the banks of the Susquehanna, below the bridge at Harrisburg. June. On cobblestones on river bars at Marietta, Pa. July (Mr. Ezra J. Nolt). On the banks of the Delaware near Callicoon, N. Y. July (Schaupp). On sand bars of Little Miami River, at Plainville, O. June (Mr. C. Dury).

Olivaceous or brown, beneath green, abdomen red; elytral markings consist of a white marginal band reaching from the humerus to the apex, lobed internally, slightly indicating the tip of humeral lunule, and moderately the middle band and the anterior portion of the apical lunule. Head glabrous, finely striate in front and above, eyes moderate; labrum short, almost truncate, one-toothed; palpi pale, with last joint bronzed; thorax subcylindrical, finely granulate and rugose, impressions moderate; elytra rounded at tip, not serrulate, uniformly punctate. Beneath, the palpi, pleuræ, coxæ, flanks of thorax and sides of abdomen are sparsely clothed with white hair.

C. Schauppii Horn, 1876, Trans. Am. Ent. Soc., v, 240; Schaupp, *l. c.*, p. 107. pl. 4, fig. 106; pl. 5, fig. 144.

Length 10–12 mm.=.40–.48 inch.

Habitat.—Texas.

The first specimens were collected by Mr. Emil Schorbach near Corsicana, Texas. Lately a correspondent of Mr. A. Luetgens of New York has found this species in southwestern Texas.

Head and thorax dark bronze, elytra velvety black, beneath metallic blue, sides of metasternum brilliant cupreous, abdomen red; elytral markings consist of narrow white margin, slightly dilated at the humerus and again behind it, median band reduced to a straight oblique line, connected with the margin, apical lunule slightly prolonged in front. Head glabrous, finely striate above and in front; labrum variable but longer than usual, with a very small tooth or none; thorax slightly narrowed behind, granulate, with a fringe of hair on each side above; elytra velvety black, punctuation obscured, a row of large green foveæ near the suture and a few scattered in the humeral region, tips conjointly rounded. Beneath, the palpi, pleuræ, coxæ, sides of of abdomen and flanks of prothorax are hairy. There are slight variations in the markings; the middle is sometimes nearly transverse, the prolongation of the apical lunule is sometimes detached, forming a discal dot, and is sometimes lacking; the marginal line is sometimes barely interrupted in front of the apical lunule.

ABDOMINALIS group.

Abdomen red; labial palpi pale at base; head not hairy, striate rather coarsely between the eyes, polished in front, wrinkled behind; thorax cylindrical, feebly sculptured, a fringe of hair on each side above; elytra rounded at apex, with a subsutural row of foveæ; sparsely hairy beneath, thorax glabrous beneath.

Elytra feebly punctured ..... **abdominalis.**
Elytra strongly punctured, scabrous ..... var. **scabrosa.**

C. abdominalis Fab., 1801, Syst. El., i, 237; Herbst, Kæfer, x, 202; Dej. Spec. i, 140; Lec. Ann. Lyc., 183, pl. 14, fig 13; Lec. Trans. Am. Phil. Soc., xi, p. 57; Schaupp, *l. c.*, p. 108, pl. 4, fig. 116.

Length 8–11 mm.=.32–.44 inch.

Habitat.—N. J. (pine barrens), N. C., S. C., Ga., Ala., Fla. July and August.

This species occurs in the pine barrens of New Jersey in the summer when most of the other species have disappeared. A few individuals linger into September. It occurs on paths through the pine forest, preferring these shady paths to the more open spots, but it also occurs on the East Plains, where the forest is only eighteen inches in height, and seemed there to prefer the more depressed parts of the road where the soil was darker. It is a weakly flying insect and easily captured, but does not, in New Jersey, occur in large numbers.

Shining black, beneath blue, abdomen red; elytral markings consist of two dots representing the middle band, one submarginal dot behind them and a rather conspicuous apical lunule; the dots are often lacking, but the apical lunule persists in all the specimens I have seen. Head glabrous, shining, smooth in front of the eyes, a few coarse striæ beside and between the eyes, behind them the surface is feebly wrinkled; labrum large, rounded in front, not evidently toothed; thorax cylindrical, nearly smooth, a fringe of white hair on each side above; elytra slightly narrowed in front, very faintly punctured, with a row of shallow foveæ near the suture, apex broadly rounded, not serrulate. Beneath, the pleuræ, coxæ and, for a narrow width, the sides of the abdomen are thickly clothed with decumbent white hair, but the flanks of the thorax are conspicuously bare and shining.

Var. **scabrosa** Schaupp, 1884, Bull. Br. Ent. Soc., vi, p. 108, pl. 4, fig. 117.

Length 10.5 mm.

Habitat.—Fla.—My specimens are from Miami and Cedar Keys. June.

Differs from *abdominalis* only the strong and deep punctures and foveæ of the elytra; the surface is thereby rendered very rough and scabrous.

Politula group.

Abdomen red; palpi ♂ pale at base; head not hairy, finely striate between and in front of the eyes, granulate behind; thorax subcylindrical, granulate, glabrous above and beneath; elytra densely punctate, conjointly rounded at apex; beneath not at all hairy ..... **politula.**

C. politula Lec., 1875, Trans. Am. Ent. Soc., v, 159; Schaupp, *l. c.*, p. 108, pl. 4, fig. 120.

Length 10–12 mm.=.40–.48 inch.

Habitat.—Texas. My specimens are from Cypress Mills. September to November.

Black, somewhat shining, slightly tinged with blue and bronze on head and thorax, beneath and legs blue, abdomen red; elytral markings consist of an apical lunule only. Head glabrous, finely striate between and in front of the eyes, granulate behind; labrum irregularly rounded in front, toothless; thorax not longer than wide, sides rounded, impressions moderate, surface granulate; elytra convex, oblong, densely punctate, a little less towards apex, tips conjointly rounded, not serrulate. Beneath, there are a few hairs on the legs and palpi as usual, but the body itself is not at all hairy.

Sommeri group.

Abdomen red; palpi pale; head glabrous, finely coriaceous; thorax quadrate, rather flat; elytra with humeral lunule, transverse middle band and a large round apical dot, fulvous and very broad..... **Sommeri.**

C. Sommeri Mann, 1837, Bull. Mosc., ii, 12; Chev. Mag. Zool., 1841, p. 7; Schaupp, *l. c.*, p. 108, pl. 4, fig. 118.

Length 13–14 mm.=.52–.56 inch.

Habitat.—Mex. Reported from the vicinity of San Diego, Cal., by the late Henry Edwards.

Dark cupreous, beneath cupreous or purplish, with the last two abdominal segments rufous; elytral markings consist of humeral lunule, transverse middle band and large round apical dot all very broad and reddish in color. Head depressed between the eyes, finely striato-granulate, not hairy; labrum brown, obsoletely toothed; thorax quadrate, rather flat, truncate at base, finely granulate, with a fringe of hair each side above; elytra dilated at the middle, rounded and serrate at apex, sericeous, very finely punctate. Be-

neath, the palpi, pleuræ, coxæ, flanks of thorax, legs and sides of abdomen are thickly clothed with white hair.

Since the above was written Prof. Wickham has informed me of the occurrence at Nogales, Ariz,, of *C. mexicana* Klug., Jahrb., p. 31, 1834. This species resembles *16-punctata*, and the original description is as follows:

"Subtus cuprea, abdomine rufo-testaceo, supra fusco-ænea, elytris puncto ante apicem, lunula humerali fasciaque transversa sinuata media late interruptis albis."

EXPLANATION OF PLATES.

PLATE I.

California may be divided roughly into three parts, viz.: the desert regions of the southeast, the broad central valley of the Sacramento and San Joaquin Rivers, and the mountain ranges of the coast and the eastern portion. In the first two divisions the species of *Omus* do not live; they are confined to the mountains and foot hills.

The mountain ranges of California north of Santa Barbara County may be arranged in three groups, viz.: 1st, the confused cross ranges of Del Norte, Siskiyou, Humboldt, Trinity and Shasta Counties; 2nd, the Coast Range, having a general altitude of 2000 to 6000 feet, and extending the entire length of the State; 3rd, the Sierra Nevada, having a general elevation of 5000 to 8000 feet, with occasional ridges of 10,000 feet and individual peaks that exceed 14,000 feet, and extending from the northern boundary to Tulare County.

In the first group *Omus Audouini* is found, and it occurs also to the northward in Oregon, Washington and Vancouver. In other words, Northern California is the southern limit of this species. Close to its territory is that of *Omus ambiguus*, a very closely related species.

In the second group of mountains, the Coast Range, is the territory inhabited by *Omus californicus* and *Omus Lecontei*, the first being confined to the lower foot hills about San Francisco, the second inhabiting the southern Coast Range of Monterey, San Benito, San Luis Obispo and Santa Barbara Counties, and probably, the western part of Kern County. In the northern part of Monterey County, where the two territories may overlap, occur the doubtful forms, which have some of the characters of both species, and there *Omus elongatus* should be sought.

In the third group, the Sierra Nevada, the greater elevation of the ridges interposes a greater obstacle to the free mingling of individuals of *Omus*, and each valley is liable to harbor a race which has become sufficiently differentiated for recognition. The species occurring in this region are therefore more numerous and, at the same time, less widely separated from each other. The most northern form, *submetallicus* seems the closest to *Audouini;* and as the habitat becomes more southern the divergence seems to increase. In the broadest view, the

Sierra Nevada forms, *sequoiarum*, *Edwardsii*, *intermedius* and *Hornii*, all seem to me to be geographic races of *sequoiarum* and closely related to *Audouini*. Finally, in the most southern part of the range, the greatest divergence from the northern *Audouini*, *Omus lævis* is reached.

The purpose of this plate is to present, more clearly than by words alone, the remarkable fact that each of the species of *Omus* is confined to its own especial territory, as may be seen by following the dotted lines which outline the regions in which each is found.

PLATE II.

The drawings of the labrum of several species are given to show the variation in this part of the body. They are drawn from individual specimens, and it should be remembered that the labrum is subject to considerable individual variation.

The mandible of the usual form, both front view and side view, is drawn to show the differences that exist in the mandibles of *dorsalis*, *hamata* and *marginata*. The front view is not drawn for these, as it is the same as the normal view.

The apex of the elytra, ♂ and ♀, is drawn for several species, but not for all those in which the apex is externally emarginate.

To avoid any misunderstanding of the terms used in describing the maculation of the elytra, the different marks are numbered, and a corresponding number is given in the key in the lower right hand corner.

PLATES III AND IV.

In these plates the markings of most of the species are shown. When the markings vary a specimen with the most complete markings has been selected, and departures from the types shown will usually be in the direction of the obliteration of the markings, *e.g.*, in *sexguttata*, the drawing shows four dots, though this species often occurs with three or two or one, or even none at all. In some of the drawings, the elytra are wider than they should be. The drawings are all about twice the natural size.

ERRATA.

Pages 95, 99, 100, 103, 104, *for* Audouinii *read* Audouini.

" 106, line 1, *for* western *read* eastern.

" 117, line 1, *for* B *read* C.

" 123, line 14, *for* River's *read* Rivers'.

" 123, line 25, "*fide* Schaupp" should follow Arizona, not Colorado.

" 146, line 31, *for* upturned *read* C-shape.

" 157, after line 20, add: Of *C. lunalonga* the type and one other specimen are in the collection of Charles Fuchs of San Francisco.

" 169, line 7, *for* Symrna *read* Smyrna.

" 176, lines 6 and 7 should be less indented.

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BUTTE
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GLENN
LAKE
COLUSA
SUTTER
YUBA
NEVADA
PLACER
EL DORADO
SONOMA
NAPA
YOLO
SACRAMENTO
AMADOR
CALAVERAS
SOLANO
MARIN
CONTRA COSTA
SAN JOAQUIN
TUOLUMNE
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SAN FRANCISCO
ALAMEDA
STANISLAUS
MARIPOSA
SAN MATEO
STA CLARA
STA CRUZ
MERCED
MADERA
MONTEREY
FRESNO
TULARE
INYO
KINGS
SAN LUIS OBISPO
KERN
SAN BERNARDINO
STA BARBARA
VENTURA
LOS ANGELES
ORANGE
RIVERSIDE
SAN DIEGO
SKETCH MAP OF
CALIFORNIA
TO ILLUSTRATE
THE DISTRIBUTION
OF OMUS
C.W.L.

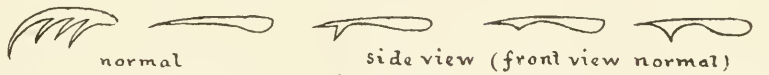
LABRUM

obsoleta unipunctata longilabris celeripes scutellaris purpurea generosa

senilis ancocisconensis dorsalis hamata gratiosa lemniscata striga

Schauppii abdominalis politula rufiventris pamphilaviridisticta Sommeri

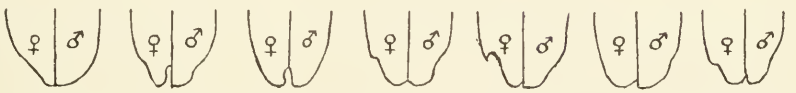
MANDIBLE



normal side view (front view normal)

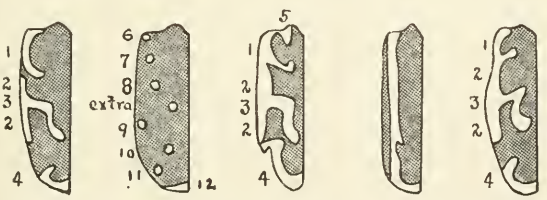
front view side view dorsalis ♂ hamata ♂ marginata ♂

APEX OF ELYTRA



dorsalis marginata hamata puritana cuprascens circumpicta Wapleri

TYPES OF MARKING



repanda 16-punctata cuprascens lemniscata hirticollis

1. humeral lunule
2. marginal line
3. middle band
4. apical lunule
5. basal dot
6. humeral "
7. post humeral dot
8. marginal "
9. supplementary "
10. discal "
11. anteapical "
12. apical "

C.W.L.

ELYTRAL MARKINGS.

C.W.L.

ELYTRAL MARKINGS.

SYNOPSIS OF ANDRENINÆ.

BY CHARLES ROBERTSON.

Since the publication of the synopsis of the local species of *Andrena*, in Trans. Am. Ent. Soc., xviii, 49, 1891, quite a number of species have been added, some missing sexes have been found, as well as some characters which may be useful in separating the species. I feel quite responsible for the things to which I have given names, and I hope that the following table will facilitate their recognition. All of the characters used here have been used before in my descriptions of different species.

The group is so heterogeneous that it ought to be divided into several genera. Its size would justify this, even if it could be shown that the genera are of less than ordinary validity.

Unless otherwise indicated, enclosure = the enclosed space at base of metathorax; fovea = facial or supraorbital fovea; process = basal process of labrum; vein III_5 = 2nd transverse cubital nervure; vein IV_3 = 1st recurrent nervure; vein IV_2 = 2nd recurrent nervure; cell III_{1+2} = marginal cell; cell III_5 = 2nd submarginal cell; cell III_4 = 3rd submarginal cell; "joint" refers to antenna; "segment" refers to abdomen.

FEMALES.

Enclosure strongly rugose, usually bounded by salient rim, usually truncate; sides of segment 2 less widely depressed, more or less gibbous, with a small fovea; joint 3 shorter than 4 + 5; outer face of hind tibia with simple hairs ..... **Trachandrena.**

Enclosure triangular, defined by impressed line or by absence of hair, usually continued to a point on posterior face, not so strongly rugose; joint 3 usually as long as, or longer than, 4 + 5 ..... 1.

1. Hairs on outer face of hind tibia plumose ..... 4.
   Hairs on outer face of hind tibia simple ..... 2.
2. Glossa filiform, pubescent; labial palpi long, joints subequal; clypeus produced; cheek broad behind summit of eye; joint 3 = 4–6 ..... **Iomelissa.**
   Glossa as usual; labial palpi short, joints unequal ..... 3.
3. Vein III_5 present ..... **Andrena** or **Opandrena.**
   Vein III_5 absent; process small, triangular ..... **Parandrena.**
4. Tibial scopa thin, thinly plumose ..... **Ptilandrena.**
   Tibial scopa dense, densely plumose ..... **Pterandrena.**

MALES.

Enclosure strongly rugose; antenna long, joint 3 shorter than 5, rarely as long as 4; face without yellowish marks ..... **Trachandrena.**

Enclosure triangular, defined by an impressed line or by absence of hair, not so strongly rugose; joint 3 longer than 4 and as long as, or longer than, 5, except in *O. personata* ..... 1.

1. Face with yellowish marks ..... 4.
   Face without yellowish marks ..... 2.
2. Glossa filiform, pubescent; labial palpi long, joints subequal; clypeus produced; cheek broad behind summit of eye; joint 3 = 4-6 ..... **Iomelissa.**
   Glossa and labial palpi as usual ..... 3.
3. Joint 3 longer than 4 + 5, cheek with a rounded angle ..... **Ptilandrena.**
   Joint 3 not longer than 4 + 5 ..... **Andrena.**
4. Vein III_5 absent; process small, triangular; angles of ventral segment 6 reflexed ..... **Parandrena.**
   Vein III_5 present ..... 5.
5. Glossa filiform, pubescent; labial palpi long, joints subequal ... **Iomelissa.**
   Glossa and palpi as usual ..... **Opandrena** or **Pterandrena.**

Trachandrena is a distinct group, whose forms may be separated by a peculiar set of characters which are of little use in separating the species of the other genera.

Ptilandrena is an offshoot from *Andrena*, as here limited, the loosely plumose scopæ being adapted for holding the large pollen grains of *Claytonia virginica* and *Geranium maculatum*, of which the species are oligotropic visitors.

The species in which the males have yellowish face-marks fall into two groups, *Opandrena* and *Pterandrena*, the latter having densely plumose scopæ for carrying the fine pollen of Compositæ, of which the species are oligotropic visitors. *P. lauracea*, however, has not been observed collecting pollen; but I expect to find it getting pollen from some of the Compositæ.

In *Iomelissa* the face-marks of the male and the tibial scopæ of the female indicate a recent origin from *Opandrena*. The great elongation of the glossa is correlated with the deep seated nectar of *Viola*, of which the single species is an oligotropic visitor.

Parandrena is developed from *Opandrena* by obliteration of vein III_5. I have two specimens having this nervure present in one wing. As a rule, specimens with this nervure wanting should be run through the tables, just as if it were present, and should not be referred to *Parandrena*, unless there is quite a series of specimens otherwise resembling the type. As I have stated before, it is the most unstable element in the venation of bees. I have found it

wanting in *T. claytoniæ, forbesii, hippotes, A. arabis, geranii, illinoensis, platyparia, O. bipunctata, personata, robertsonii, Pterandrena asteris, krigiana and solidaginis.*

The tibial scopæ of *Andrena, Pterandrena* and *Ptilandrena* in structure are quite analogous to those of *Synhalonia, Melissodes* and *Entechnia.*

All of the genera mentioned here are vernal,* except *Andrena* and *Pterandrena. Andrena* is vernal, with the exception of *A. nubecula. Pterandrena* is autumal, with the exception of *P. lauracea, krigiana* and *rudbeckiæ.*

For an account of oligotropic bees and a list of the food plants of several species of Andreninæ, see Botanical Gazette, xxviii, 27–38, 215; xxx, 130; xxxii, 367.

TRACHANDRENA gn. nov. (Type *Andrena rugosa* Rob.).

FEMALES.

Fovea below not unusually separated from eye.....9.
Fovea below separated from eye by a more or less cuneate shining space.....1.
1. The space narrower than contiguous portion of fovea.....5.
The space at least as wide as contiguous portion of fovea.....2.
2. Mesonotum bare, almost impunctate; segment 2 depressed to the base..nuda.
Mesonotum pubescent, rather closely and strongly punctured.....3.
3. Segment 2 depressed three-fourths, or more.....rugosa.
Segment 2 depressed about two-thirds; front shining, sparsely, finely punctured.....4.
4. Base of abdomen almost impunctate.....spiræana.
Base of abdomen closely punctate.....heraclei.
5. Abdomen closely punctured, with distinct pubescent fasciæ, segment 2 depressed about one-half.....8.
Abdomen more shining, less closely punctured, fasciæ indistinct, widely interrupted, segment 2 depressed more than one-half.....6.
6. Metathorax on each side of enclosure coarsely reticulated and nearly bare; nervures and stigma dark.....obscura sp. nov.
Metathorax on each side of enclosure rather finely rugose and closely pubescent.....7.
7. Pubescence of mesonotum pale; enclosure rounded at apex; abdomen usually more or less red.....mariæ.
Pubescence fulvous; enclosure truncate; abdomen black; legs red..hippotes.
8. Abdomen very closely and evenly punctured, fasciæ very distinct; pubescence of mesonotum short and feathery.....quintilis.
Abdomen less strongly and closely punctured, fasciæ less distinct; pubescence of mesonotum long, nearly simple, more fulvous.....forbesii.

* Vernal is used here as opposed to autumnal. The species designated as venal complete their flight before July 30th.

9. Enclosure distinctly defined, with sharp ridges; abdomen fasciate, margins of segments pale testaceous ..... claytoniæ.
Enclosure less distinctly defined, rough but without sharp ridges; abdomen without fasciæ, black ..... cratægi.

MALES.

Angles of ventral segment 6 reflexed ..... cratægi.
Angles of ventral segment 6 simple ..... 1.
1. Joint 3 = 4, or nearly; abdomen usually more or less reddish ..... mariæ.
Joint 3 shorter than 4, abdomen black ..... 2.
2. Segment 2 depressed less than one-half ..... 5.
Segment 2 depressed at least one one-half ..... 3.
3. Hind tibia reddish ..... hippotes.
Hind tibia black ..... 4.
4. Pubescence more dense; abdomen distinctly punctured ..... rugosa.
Pubescence less dense; abdomen almost impunctate ..... spiræana.
5. Segment 2 depressed less than one-half; antenna smooth and shining...forbesii.
Segment 2 depressed one-third; insect feebly punctured; flagellum moniliform. claytoniæ.

ANDRENA F.

FEMALES.

Abdomen not red ..... 2.
Abdomen red ..... 1.
1. Head and thorax greenish; scutel purplish; length 7–8 mm.; enclosure broad. illinoensis bicolor.
Head and thorax black; length 10–11 mm.; cheeks broad ... erythrogastra.
2. Tibial scopa pale ..... 5.
Tibial scopa largely black ..... 3.
3. Pubescence black, except on thorax above, vertex, and sometimes middle of face. carlini
Pubescence not black; tibial scopa black on posterior edge ..... 4.
4. Abdomen bare; pubescence ochraceous; cells III_5 and III_4 subequal; joint 3 longer than 4 + 5; fovea extending below antenna .. viciniformis.
Abdomen with long pubescence, subfasciate; pubescence griseous; cell III_4 one-third longer than III_5; joint 3 about = 4-6; fovea not extending below antenna ..... erythronii.
5. Abdomen without bluish or greenish tinge ..... 8.
Abdomen with bluish or greenish tinge, finely roughened, impunctate, or nearly, thinly fasciate; small species ..... 6.
6. Vein IV_3 arising before middle of cell III_5; stigma dark; abdomen bluish; hind tibia and tarsus subequal ..... geranii.
Vein IV_3 arising at or beyond middle of cell III_5; stigma pale; abdomen greenish; smaller species ..... 7.
7. Scutel purplish; enclosure broad; slender species ..... illinoensis.
Scutel not purplish; enclosure ordinary; less slender species ..... polemonii.
8. Hind tibia cuneate, apex twice as broad as metatarsus, outer face with short hair; enclosure broad, rugose; segments 1–2 opake, finely roughened; with shallow punctures; fovea broad, extending below base of clypeus; joint 3 = 4 + 5 ..... nasonii.
Hind tibia at apex less than twice as broad as metatarsus ..... 9.

9. Cell III_{1+2} and beyond clouded; fovea narrow, not reaching below antenna; middle metatarsus wider than tibia; abdomen finely roughened, segment 1 without, 2–4 with continuous white fasciæ; cell III_5 short. nubecula.

Cell III_{1+2} and beyond without a distinct cloud ..... 10.

10. Fovea broad ..... 13.

Fovea narrow ..... 11.

11. Eye widely separated from fovea; process large, semicircular; joint 3 = 4 + 5, or nearly; pubescence dense, ochraceous; abdomen not fasciate. pruni.

Eye and fovea contiguous; process small, rarely semicircular; pubescence thin, griseous; abdomen with thin whitish fasciæ ..... 12.

12. Cheek narrow, regularly rounded; abdomen opake, finely roughened, with sparse rather coarse shallow punctures; enclosure finely roughened, except at base; joint 3 = 4–6, or nearly ..... arabis.

Cheek broad, flat, subcarinate behind; abdomen shining, with minute sparse punctures; enclosure, and metathorax beyond, rugose; joint 3 longer than 4 + 5 ..... platyparia.

13. Abdomen impunctate, or nearly so ..... 16.

Abdomen distinctly punctured, at least segments 1–2 ..... 14.

14. Enclosure unusually rugose, sometimes truncate, narrow; postscutel bare, swollen; abdomen with pubescence long, thinly subfasciate ..... sayi.

Enclosure ordinary; postscutel pubescent ..... 15.

15. Pubescence fulvous, except the thin fasciæ; clypeus closely punctured, pubescent; tibiæ and tarsi reddish; abdomen opake ..... corni.

Pubescence thin, whitish; clypeus shining, coarsely, sparsely punctured, especially towards apex; enclosure poorly defined; abdomen shining, thinly fasciate; vein IV_3 arising before middle of cell III_5 .. geranii

16. Abdomen with short pubescence, fasciate; joint 3 = 4 + 5 ..... 19.

Abdomen with long thin pubescence, subfasciate ..... 17.

17. Cheek subtriangular, produced to a rounded angle a little above middle of eye; mesonotum and scutel opake ..... mandibularis.

Cheek regularly rounded; joint 3 longer than 4 + 5 ..... 18.

18. Hind tibia black, about equaling tarsus; scopa with black hairs at base above; enclosure more rugose; abdomen shining; fovea narrower. salicacea.

Hind tibia reddish, shorter than tarsus; disc of mesonotum and scutel shining; enclosure less rugose; fovea broader ..... macoupinensis.

19. Pubescence ochraceous; fovea extending as far as base of clypeus; abdomen opake, finely roughened, with thin ochraceous fasciæ ..... salicis.

Pubescence griseous, thin; fovea narrower, not extending below antenna; abdomen shining, with thin whitish fasciæ; resembles *O. bipunctata*, but the clypeus not shining ..... northoscordi.

MALES.

Cheek broad and flat, presenting a rounded angle ..... 10.

Cheek regularly rounded and convex, without a rounded angle ..... 1.

1. Abdomen greenish or bluish; joint 3 longer than 5 ..... 8.

Abdomen black ..... 2.

2. Cheek without black pubescence ..... 4.

Cheek with black pubescence; joint 3 about as long as 5 ..... 3.

3. Sides of face, front and cheeks with black hair; abdomen shining; cell III_5 = III_4 to vein IV_2 ..... carlini.
   Cheek behind summit of eye with some black hairs; cell III_5 about one-half as long as III_4 ..... salicis.
4. Cell III_4 twice as long as III_5; rather small species ..... 7.
   Cell III_4 not twice as long as III_5; rather large species; joint 3 = 5 ..... 5.
5. Last ventral segment with a conspicuous tuft of long hair ..... pruni.
   Last ventral segment without a conspicuous tuft of long hair ..... 6.
6. Cell III_4 longer than III_5; abdomen with rather long pale pubescence, subfasciate; enclosure rather coarsely rugose ..... sayi.
   Cell III_4 and III_5 subequal; abdomen with short dark pubescence, not subfasciate; enclosure finely rugose ..... viciniformis.
7. Wing with conspicuous cloud at tip; joint 3 = 5; enclosure finely rugose at base; apical ventral process truncate ..... nubecula.
   Wing hyaline; joint 3 sometimes no longer than 4; enclosure unusually rugose; apical ventral process emarginate ..... nasonii.
8. Apex of abdomen densely tufted; enclosure quite broad; scutel usually purplish; slender species ..... illinoensis.
   Apex of abdomen not densely tufted; enclosure ordinary; scutel without purplish; less slender species ..... 9.
9. Abdomen bluish; vein IV_3 arising before middle of cell III_5 ..... geranii.
   Abdomen greenish; vein IV_3 arising beyond middle of cell III_5 .. polemonii.
10. Cheek various, the angle opposite or below middle of eye ..... 13.
    Cheek subtriangular, the angle above middle of eye ..... 11.
11. Mandibles simple at base; joint 3 shorter than 4 + 5; abdomen impunctate, segments with margins broad, testaceous, elsewhere more or less black and greenish, or more or less red; flagellum pale beneath ..... erythrogastra.
    Mandibles toothed at base; angle of cheek strongly produced, compressed, sometimes a little carinate; pubescence of head without black .... 12.
12. Joint 3 about = 5 ..... mandibularis.
    Joint 3 about = 4 + 5 ..... tridens sp. nov.
13. Cheek subtriangular, angle opposite middle of eye; joint 3 almost as long as 4 + 5; abdomen greenish ..... erythronii.
    Cheek broad, subquadrate, border carinate; angle below middle of eye; clypeus strongly produced, reflexed, widely emarginate .... platyparia.

PTILANDRENA gn. nov. (Type *Andrena erigeniæ* Rob.).

FEMALES.

Hind tibia as long as the tarsus; fovea narrow; joint 3 nearly = 4-6.

Fovea not reaching below antenna; process short, broad; abdomen opake, rather strongly, sparsely punctured ..... erigeniæ.

Fovea reaching below antenna; process triangular, truncate or emarginate; abdomen shining, impunctate, or nearly ..... g. maculati.

MALES.

Angle of cheek above middle of eye; joint 4 shorter than 5; abdomen punctate, angles of ventral segment 6 somewhat reflexed, apical ventral process strongly and sharply furcate ..... erigeniæ.

Angle of cheek below middle of eye; joints 4 and 5 subequal; abdomen almost impunctate ..... g. maculati.

OPANDRENA gn. nov. (Type *Andrena cressonii* Rob.).

FEMALES.

Abdomen closely, evenly, rather strongly punctured, segments 2–4 whitish fasciate; process small; enclosure short ..... cressonii.
Abdomen impunctate or nearly so ..... 1.
1. Length 6–7 mm., abdomen greenish ..... 3.
Length 8–9 mm., abdomen black ..... 2.
2. Clypeus smooth, shining and impunctate, except on the sides; enclosure finely rugose, except basal middle ..... bipunctata.
Clypeus finely rugose, opake; enclosure rather strongly rugose .. robertsonii.
3. Fovea narrow; clypeus bare, convex, metallic; enclosure rugose; cell III_5 long. personata.
Fovea broad; clypeus more pubescent, flatter, not metallic; enclosure less rugose; cell III_5 shorter ..... ziziæ.

MALES.

Abdomen impunctate or nearly so ..... 2.
Abdomen closely, evenly, rather strongly punctured, apical ventral process linear; enclosure short; face marks pale yellowish ..... 1.
1. Joint 3 = 4 + 5; apical middle of clypeus black; lateral face marks large, subquadrate ..... cressonii.
Joint 3 = 5; entire apical margin of clypeus black; lateral face marks subtriangular, rather small, sometimes wanting ..... dubia.
2. Face marks whitish; abdomen greenish; the smallest species ..... 4.
Face marks yellow; abdomen black; joint 3 = 5 ..... 3.
3. Cheek narrow, convex, regularly rounded; enclosure unusually broad and rough; abdomen finely, sparsely punctate; angles of ventral segment 6 reflexed; clypeus yellow ..... robertsonii.
Cheek broad, flat, subtriangular, with a rounded angle behind middle of eye; enclosure small, finely rugose, except basal middle; abdomen almost impunctate; clypeus, and sometimes spot on each side of face, yellow. bipunctata.
4. Antenna short, joint 3 nearly = 4 + 5; clypeus rather flat, whitish; sometimes a whitish dot on each side of face ..... ziziæ.
Antenna long, joint 3 no longer than 4; clypeus convex, whitish, as well as a spot on each side of face ..... personata.

PTERANDRENA gn. nov. (Type *Andrena pulchella* Rob.).

FEMALES.

Stigma more than one-half width of cell III_{1+2} ..... 3.
Stigma less than one-half width of cell $_{1+2}$ ..... 1.
1. Face with a large yellow spot on each side; cheek nearly as broad behind summit of eye as elsewhere; pubescence rather dense, fulvous; abdomen distinctly punctate, shining, broad apical margins of segments pale testaceous ..... pulchella.
Face without yellow marks ..... 2.

2. Wings clouded at apex; middle metatarsus broader than tibia, broader than hind one; process bidentate; abdomen pubescent, opake, with large, close, shallow punctures.....rudbeckiæ.
   Wings hyaline; middle metatarsus hardly broader than hind one; legs, especially the tarsi and hind tibiæ, inclining to yellowish ferruginous; process triangular, truncate or emarginate, abdomen almost impunctate. helianthi.
3. Clypeus yellow; stigma dark; pubescence thin, pale; abdomen finely rugose, opake.....aliciæ.
   Clypeus black.....4.
4. Middle metatarsus not broader than hind one; process emarginate; abdomen smooth, shining, sparsely punctate.....6.
   Middle metatarsus broader than hind one; process strongly bidentate; abdomen finely rugose, opake, impunctate, or nearly so.....5.
5. Fovea extending a little below antenna; length 11 mm.....asteris.
   Fovea not extending below antenna; length 9 mm.....solidaginis.
6. Joint 3 = 4–6, 4–10 broader than long; fovea not reaching antenna; mesonotum opake.....krigiana.
   Joint 3 = 4 + 5, 6–10 not broader than long; fovea extending a little below antenna; mesonotum a little shining.....lauracea.

MALES.

Process entire or slightly emarginate or bidentate; joint 3 longer than 4 + 5..4.
Process strongly cleft, strongly bidentate.....1.

1. Stigma large; angles of ventral segment 6 reflexed; joint 3 = 4 + 5; abdomen finely rugose, impunctate or nearly, segments with whitish fasciæ..3.
   Stigma small, narrow; joint 3 longer than 4 + 5; abdomen distinctly punctate; clypeus and a spot on each side of face yellowish.....2.
2. Abdomen opake, quite pubescent; wings clouded, nervures dark; face marks whitish.....rudbeckiæ.
   Abdomen shining, thinly pubescent; wings hyaline, nervures pale; margins of segments broadly pale testaceous; face marks yellow..pulchella.
3. Clypeus and a spot on each side of face yellowish, length 9–10 mm...asteris.
   Clypeus whitish, length 7 mm.....solidaginis.
4. Stigma small; wings whitish, nervures pale; clypeus yellow; tibiæ and tarsi more or less testaceous.....helianthi.
   Stigma large.....5.
5. Antenna long, middle joints as long as wide; cheek broad; stigma dark; clypeus yellow; abdomen opake, finely rugose.....aliciæ.
   Antenna short, middle joints shorter than wide; cheek narrow; stigma pale; clypeus with trilobed yellowish spot; abdomen smooth and shining. krigiana.

A MONOGRAPH OF THE NORTH AMERICAN EMPIDIDÆ.*

BY AXEL LEONARD MELANDER.

PART I.

Although at the present time a Monograph of the family Empididæ is not, perhaps, so much needed as that of some other Dipteron families, on account of the revision in 1895 by Mr. D. W. Coquillett; yet the material accumulated by Dr. Wm. M. Wheeler during several years, probably the richest collection of Empididæ on this continent, and which he has kindly relinquished—has turned the writer into this channel.

Owing to the number of species in this family, it was thought best to publish the work in two parts. For the second part the genus *Rhamphomyia* alone is left, taking *Rhamphomyia* in its broad sense as those Empidinæ with long proboscis, in which the third vein is unforked. But as this genus is one of the largest of the genera of the animal kingdom, the parts are nearly balanced.

The fine collection of these flies contains material gathered together by Dr. Wheeler since 1890, representing the endeavors of himself and of Messrs. J. M. Aldrich, C. F. Baker, C. Chagnon, James Hine, G. de N. Hough, C. W. Johnson, G. R. Pilate, W. A. Snow, H. E. Summers, S. W. Williston and Mrs. A. T. Slosson, to all of whom our greatest thanks are due.

This collection has been supplemented by most of the Empididæ gathered for the Biologia Centrali-Americana of Messrs. Godman and Salvin by Messrs. H. H. Smith and F. Gaumer. However, although so rich in material the collection is still far from being complete. Many of the previously described species are not represented. This results not from any negligence on the part of the collectors, but because the regions explored are widely separated, and because, in most cases, the collecting was confined to a few months of the year. The zeal of the collectors is apparent from the fact that of the one hundred and ninety species (omitting some of the unrecognizable ones of Francis Walker) described before our work

* Contribution from the Zoological Laboratory of the Univ. of Texas. No. 26.

on this family, and distributed among the genera treated in this paper, seventy-four, or nearly forty per cent. are represented in the collection. Besides these described species we have discovered eighty new forms. The fact alone, that in a collection of insects, even as superficial as this one necessarily is, and representing a family so recently revised, more than half of the species are new shows the enormous work yet to be done in systematic dipterology. Five genera, previously unknown from this continent, are here added, and in addition four new genera are established. Another genus is erected, but as the insect represented was taken in Brazil, it does not properly come within the confines of this paper, and has therefore been added as a foot-note. Several changes in synonymy have also been effected. As an interesting note in this connection attention may be called to the fact that thirty-one years ago only eighteen genera were known to Dr. H. Loew* as occurring in North America, as compared with the thirty-seven now given. Will the genera again be doubled in the next thirty years?

In this paper I have attempted to gather the descriptions made by former observers, and to reduce all to English, in some cases abbreviating the original. The analytical keys are in large part based upon Mr. Schiner's excellent work on the Austrian Flies, a work which has been partially followed also in preparing the generic diagnoses.

The family Empididæ includes rather small to moderate sized flies. The smallest species of the family belong to *Drapetis* and measure only $\frac{1}{25}$ inch. The largest forms reach a length of $\frac{1}{2}$ inch. With the exception of a few brilliant, metallic Mexican species, most of the species are very modest in coloration, a sombre gray-black being the most prevalent color.

Their habitus is generally the following : an almost spherical head with large eyes, generally long pointed antennæ and a slender proboscis, directed either forward or downward; a slender body, the thorax large, the abdomen long, terminating sharply in the female and more or less club shaped in the male; the legs generally very long and slender, especially the hinder pair, though not so noticeably long as in the Dolichopodid flies.

The structural characters of the family present a wide range of variation. Perhaps the principal morphological character of a dip-

* Monogr. Dipt. N. Am., No. 1.

teron lies in the structure and neuration of the wings. We are mainly assisted by the venation in assigning a fly its systematic position, and this is because the veins in an insect's wing have become fixed through long periods of evolutionary change. If we take venation as our chief criterion, the family Empididæ consists of an incongruous assortment of genera. This is much more marked than in most other families of Diptera, so much so that what is now given as one family was formerly divided into three. In groups like the Dolichopodidæ or Syrphidæ venation is of paramount importance, and exhibits relatively little variation for all the members of the family. But in the Empididæ the number and the arrangement of the veins may vary considerably. The larger genera have the full number of veins and cells, but in the smaller forms there is a basal coalescence of the posterior veins, until the anal cell vanishes and the posterior cells become reduced to two. The next character in which Empididæ are variable is the structure of the antennæ. Here, again, the larger genera have normal three-jointed antennæ, of which the third joint is typically longer than the first or second, and bears a variable terminal style or arista. In many of the smaller genera the antennæ are reduced in length, the first and second joints may become fused into one, and the arista may become even sub-dorsal, in which case these insects, superficially at least, bear a close resemblance to the smaller Muscidæ, a resemblance which is heightened by the similarity of the wings.

Work on the homology of the parts of the male hypopygium in the different genera and families of flies has made but little advance as yet. That much is to be accomplished in this line may be judged from the similar work in other groups, as for example, the happy results obtained by Prof. J. B. Smith from the study of *Lachnosterna*, and especially since the Empididæ present so large a number of interesting and anomalous forms. Even in a single genus, we may cite here *Platypalpus* or *Empis*, there is a wide range in the plasticity of similar parts. For this reason we have laid greater stress than usual upon the conformation of the male genitalia, relying not so much, however, on verbal description as upon the series of figures of the various forms.

With these words of introduction we may come to a definition of the family. Empididæ are distinguished as such from all other flies by the following combination of characters: Body chitinous; an-

tennæ two- or three-jointed, the outer joint simple, not ringed, and provided with a terminal or sub-dorsal arista of various length; vertex not hollowed; empodia small, at least never swollen; never more than four posterior cells present in the wings, all of which are open; anal canal closed far from the border if present (except in the Mythicomyiinæ); second basal cell not confluent with the discal cell if we except some of the species of *Hemerodromia*.

In addition to these points, there are other characters peculiar to the family. The body is rather long and slender, the thorax generally very prominent. The head is nearly spherical and attached loosely to the thorax. Although never minute the head is often small, a character made pronounced by the large thorax. The eyes often occupy nearly the whole head, sometimes the males are holoptic, sometimes dichoptic; in some cases the eyes of the female are contiguous below the antennæ. Generally the females are dichoptic. Of one species both sexes may have similar eyes, or the female may be dichoptic and the male holoptic. At the insertion of the antennæ there is an emargination of the eyes, more or less deep and wide. The eyes are nearly always bare and composed of small ommatidia, which may be of uniform size or rarely larger above. Three ocelli are present. On account of the variation in the size of the eye there is a corresponding difference in the construction of the genæ. These are largest in *Coloboneura*, whereas in many of the Empididæ the eyes reach the oral margin, and the cheeks disappear. The mouth-opening is small; in some species, such as *Platypalpus hians*, it is relatively larger. The mouth may be surrounded by small bristles, but no large oral vibrassæ are ever present. The face is without a mystax, but in *Empimorpha* it is covered with long hair. The proboscis, which is generally adapted for piercing, is variable in length and structure. Sometimes it is minute and thickened, often it surpasses the head and thorax, in which case it is either directed backward or downward and is slender, or, more rarely, it is directed forward and is then generally moderately thickened. Palpi one- to three-jointed, bristly or not, projecting forward or applied to the proboscis, ribbon like and slender, to oval, short, and broad. Antennæ porrect, generally diverging, approximated at the base, of various shapes, generally three-jointed, often two-jointed. Most often the basal joints are short and the third joint longer, rarely the third joint is the shortest. The antennal appendage consists of a

style or arista, terminal, except in a few genera, where it is sub-dorsal. It may be short, stubby, thick, and two-jointed, as the style, or slender and hair like, and several times the length of the antenna, as the arista. In one case (*Hilara Johnsoni*) the arista is spirally curled. The arista is never plumose. The basal antennal joints may be more or less bristly, but this is not the case with the third joint; this joint varies greatly in shape, it may be short and stunted, rather large and globose, oval, or lanceolate. The face may be obliterated by the contiguity of the eyes, or may be broad and convex, with the clypeus prominent, nearly always bare. On the occiput the postocular bristles are more or less prominent, as are also the ocellar bristles.

The thorax is often prominent, larger than the remainder of the body and hunchbacked; though sometimes more or less flattened dorsally. The humeral angles may be prominent. The dorsum and pleuræ are generally covered with glaucous pollen. The arrangement and the size of the bristles and hairs are extremely variable. The margin of the scutellum is provided with from two to very many bristles.

The abdomen is generally long and slender and more or less cylindrical, sometimes broad and flat, consisting of five to seven segments, its hairiness variable. Ovipositor simple, generally small, sometimes projecting as in *Leptopeza;* hypopygium prominent, often large and extremely complex, generally reflexed over the abdomen. The ventral spots so characteristic of most dolichopodid genera are conspicuously present in *Coloboneura* and many *Empis*.

Legs of varying structure, often the coxæ and femora are elongated, often the femora are thickened and provided with spines below; in *Hemerodromia* the front ones are enlarged, in *Platypalpus* the middle ones, in *Hybos* the hind ones, in *Pachymeria* all, etc.; the metatarsi of the males of *Hilara* and some *Empis* are peculiarly enlarged; the legs of various species are provided with characteristic ornaments, the femora and tibiæ of some females being ciliated with scale-like hairs, while of some males they are armed with projecting structures. The arrangement of the bristles is variable, as is the amount of hair present. Pulvilli moderate, empodia small, ungues plain.

Wings normally parallel with the body, rather large, long, and narrow; neuration variable. The discal cell may be present or

absent, one or two submarginal cells, and two to four posterior cells may be present, the anal cell present or wanting; if present closed far from the border of the wing (except in the Mythicomyinæ which properly do not come within the limits of this family). The front border of the wing is provided with small bristles, which in at least one species takes on the character of curved hooks. The formation of the anal angle is of generic distinction, it may be rectangularly developed or diminished to an even curve. Tegulæ small, simple, not conspicuously ciliated, halteres simple.

Little is known of the metamorphoses of the Empidæ. The larvæ are said to resemble those of the Asilidæ. They have been found in rich earth, under leaves and other decaying vegetable matter. The pupæ are free, and with two porrect points at the anterior end.

The Empididæ are all predaceous flies, though at times they are found about flowers. Many of the species fly in swarms in an ærial dance over brooks or shrubbery. Some of the smaller forms fly close to the ground and alight on stones. All are rather sluggish in movement and therefore easy to catch.

As an example of the habits of these flies we may cite *Hilara trivitatta*, the most conspicuous of the early spring insects of central Texas, and the only one that appears in numbers at that time of the year.

Coming before the Bibios and taking the place of the later-appearing Ephydridæ the flies swarm in immense numbers over the swiftly-running streams. Over open pools, especially where the water moves swiftly, the flies skim along the surface, almost all oriented alike, facing windward. By a gradual zig-zag flight they reach the windward edge of the pool, when some, hovering a moment, are blown back, while the others take a sharp turn and fly to the starting point. A part fly with the feet touching the surface of the water, others skim along a few inches higher. In the sunshine a swarm of the flies can be seen hovering and zig-zagging at a height of several feet above the brook.

When copulating the pair float on the surface, and are swiftly carried down stream. The more curious of the skimming flies come one by one to settle on the drifting pair, and then fly away to some other object. If a bit of grass be sent down stream the flies come one at a time in quick succession to it, impelled either by hunger or by the feeling of assisting a helpless object. This latter point is

shown when a newly-emerged fly of the same species is set adrift. The flies gather about until a ball of dozens of individuals is floating down stream. Soon the ball collides with some object and breaks up; the flies then resume their zig-zag path up stream to their former haunts, while others gather about the floating nymph.

In these *Hilara* swarms the males are much more numerous. Their dilated fore-metatarsi perhaps serve in keeping the flies just touching the water. The females of the European species are said to fly about the bushes along the edges of the streams, but in *trivittata* they mingle with the males in their strange dance. Some of the European species form balloons of spun web somewhat similar to those made by the North American *Empis ærobatica* during courtship, as described by Aldrich and Turley (Am. Nat., Oct., 1899).

Trivittata appears regularly at mid-winter and remains nearly two months hovering over the smaller streams.

In conclusion, I desire to thank Dr. Wheeler for the use of his library, and for similar courtesies Dr. Williston, Mr. Henshaw and Prof. Comstock. For assistance in looking up bibliography I wish to express my thanks also to Miss Mabel Evans and to Mr. Henry Barroll; and especially for the kindness and liberality of the gentlemen whose collections have made this work possible I again tender my earnest appreciation.

Table of Genera.

Anal cell wanting, or if present very small and always the anal vein wanting. Fore coxæ shorter than the femora.....(TACHYDROMIINÆ) 6.

Anal cell complete, when wanting the fore femora are shorter than the fore coxæ.....2.

2. Body without macrochætæ; anal cell reaching the margin. (MYTHICOMYINÆ) 28.

Anal cell closed before border when present.....3.

3. Anal angle of wing not projecting, outline of wing more or less cuneiform; fore coxæ greatly lengthened.....(HEMERODROMIINÆ) 11.

Anal angle more or less developed; wings not cuneiform in outline; fore coxæ shorter than the femora.....4.

4. Anal cross-vein perpendicular or forming an acute angle with the basal portion of the anal vein; proboscis short; thorax prominent, generally hunchbacked.....(HYBOTINÆ) 18.

Anal cross-vein parallel with the hind margin of the wing and forming an obtuse angle or curve with the anal vein; proboscis often elongate; thorax generally not hunchbacked.....(EMPIDINÆ) 29.

TACHYDROMIINÆ.

5. A portion of the anal cell present ..... **Platypalpus** Macquart.
   Anal cell wholly wanting ..... 6.
6. Second basal cell much shorter than the first; all the femora greatly thickened; thick-set bristly species with small eyes.
   Coloboneura gen. nov.
   Not such flies ..... 7.
7. Arista terminal ..... 8.
   Arista dorsal or subdorsal ..... 10.
8. Front femora greatly thickened; wings sometimes variegated; front coxæ lengthened ..... **Tachydromia** Meigen.
   Otherwise ..... 9.
9. Last antennal joint elongate, conical ..... **Elaphropeza** Macquart.
   Last joint short, oval, or round ..... **Drapetis** Meigen.
10. Proboscis short, vertical; palpi broad; front generally of an equal breadth; hypopygium large ..... **Stilpon** Loew.
    Palpi narrow, slender; hypopygium not greatly enlarged.
    Phoneutisca Loew.

HEMERODROMIINÆ.

11. Third longitudinal vein simple, discal cell present, emitting three apical veins ..... 12.
    Third vein forked ..... 15.
12. Legs very slender, nowheres thickened ..... 13.
    Front femora robust; eyes separated; basal cells long, anal cross-vein perpendicular ..... **Litanomyia** gen. nov.
13. Third antennal joint long, acuminate, proboscis incurved.
    Synamphotera bicolor Loew.
    Third antennal joint short ovate; proboscis vertical ..... 14.
14. Eyes of the male nearly contiguous; hypopygium swollen, proboscis longer than the head; anal and second basal cells subequal (European species).
    Sciodromia Haliday.
    Eyes separated; hypopygium small; proboscis short; anal cell shorter than the second basal ..... **Oreothalia** gen. nov.
15. Head more or less flattened and horizontal; front femora greatly thickened, bristly beneath, about equalling their coxæ; when the discal cell is present it is narrow, its outer boundary short, nearly perpendicular, and generally emitting two veins to the margin, of which the anterior is furcate, or in some cases three posterior veins are present.
    Hemerodromia Meigen (sens. lat.).
    Front coxæ short, femora never thickened, not evidently spinose beneath; discal cell always present, moderately large, often pointed apically ... 16.
16. Scutellum hairy; discal cell emitting only two veins, of which the anterior is furcate ..... **Roederiodes** Coquillett.
    Scutellum bare, except for the marginal bristles; discal cell sending three veins to the wing margin ..... 17.
17. Head lengthened, reaching forward; veins two and three undulating; arista very long ..... **Ardoptera** Macquart.
    Head nearly vertical; arista moderate ..... **Clinocera** Meigen (sens lat.).

HYBOTINÆ.

18. Third vein simple ..... 19.
Third vein forked ..... 27.
19. Anal cell shorter than the second basal ..... 24.
Anal cell as long as the second basal or longer ..... 20.
20. Fourth vein forked; hind femora not incrassate ....**Meghyperus** Loew.
Fourth vein simple; hind femora more or less thickened ..... 21.
21. Origin of the second vein nearer to the humeral than to the anterior cross-vein.
Synecches Walker.
Origin of the second vein not nearer the humeral ..... 22.
22. Vein between the first and second basals indistinct .....**Syndyas** Loew.
Vein between the first and second basals distinct ..... 23.
23. Stout, bronzed species with enormously thickened hind femora (Brazilian).
Lactistomyia gen. nov.
More slender species of black or blue-black coloration .....**Hybos** Meigen.
24. Three veins at the apex of the discal cell ..... 25.
Two veins at the apex of the discal cell ..... 26.
25. Hind legs lengthened; tibiæ straight .....**Euthyneura** Macquart.
Hind femora thickened; hind tibiæ bowed .....**Oedalea** Meigen.
26. Third antennal joint conical, with a terminal bristle **Leptopeza** Macquart.
Third antennal joint oval; bristle subdorsal .....**Ocydromia** Meigen.
27. Anterior branch of the third vein terminating in the second vein.
Blepharoprocta Loew.
Anterior vein terminating in the costa .....**Brachystoma** Meigen.

MYTHICOMYIINÆ.

28. No discal cell; second vein ending in the costa..**Hilaromorpha** Schiner.
Discal cell present; second vein ending in the first.
Mythicomyia Coquillett.

EMPIDINÆ.

29. Discal cell wanting .....**Cyrtoma** Meigen.
Discal cell present ..... 30.
30. Third vein simple ..... 31.
Third vein furcate ..... 34.
31. Proboscis not longer than the head, generally extending straight forward..32.
Proboscis longer than the head; generally directed backwards; antennæ plainly three-jointed ..... 33.
32. Eyes of the male separated; hypopygium minute.
Microphorus Macquart.
Eyes of the male contiguous; hypopygium large, pedunculate, and flexed to the right .....**Holoclera** Schiner.
33. Face naked .....**Rhamphomyia** Meigen.
Face provided with bristly hairs .....**Neocota** Coquillett.
34. Proboscis evidently longer than the head ..... 35.
Proboscis not longer than the head ..... 39.

35. All the legs of nearly equal length; hind femora much thickened. **Pachymeria** Stephens.
Hind legs longer than the others, their femora but little or not at all thickened ..... 36.
36. Proboscis hanging downward or backward, and slender ..... 37.
Proboscis directed forward ..... **Itcaphila** Zetterstedt.
37. Face naked ..... 38.
Face provided with bristly hairs ..... **Empimorpha** Coquillett.
38. Metallic species ..... **Lamprempis** Wheeler and Melander.
Non-metallic species ..... **Empis** Linné.
39. Antennæ very short, apparently two-jointed, the last joint ovate, with a short thick style ..... **Hormopeza** Zetterstedt.
Antennæ formed otherwise ..... 40.
40. Proboscis shorter than the head; fore metatarsi of the male not enlarged .. 41.
Proboscis about as long as the head; fore metatarsi more or less swollen in the male ..... **Hilaria** Meigen.
41. Arista short, two-jointed ..... **Ragas** Walker.
Arista long, slender ..... **Gloma** Meigen.

TACHYDROMIINÆ.

PHONEUTISCA Loew.

"*Phoneutisca* differs from *Tachypeza* (*i. e.*, *Tachydromia*) by the sub-dorsal seta of the antennæ, the apex of the second vein abruptly recurved, so that the second half of the costa is shorter than the third, the anterior femora less incrassate; it is distinguished from *Drapetis* by the straight narrower proboscis and the narrow elongate palpi." Loew, Cent. III, 35.

The hypopygium is not enlarged as in *Stilpon*.

Legs and wings in part infuscated ..... **bimaculata** Loew.
Legs yellowish, wings clear ..... **simplicior** Wh. et M.

Phoneutisca bimaculata Loew (Fig. 1).

Cent. III, 35.

Black, shining, the elongate palpi and the halteres white, anterior knees always and posterior tarsi at base often testaceous. Wings cinereous, with a black costal spot surrounding the abruptly recurved end of the second vein, veins fuscous, third and fourth veins close together and parallel. 2 mm.

Alaska.

Two males from Brookings, South Dakota (May), differ in having the palpi black. The hypopygium, together with the abdomen, forms a small club. There are no exposed parts to the hypopygium. Viewed from behind the outline is an equilateral triangle, the base above.

Phoneutisca simplicior Wheeler et Melander (Fig. 6).
Biol. Cent. Am. 1901, Dipt. Suppl. p. 375.

Black, shining; legs yellow. Antennæ short, black, third joint shorter than the second. Vertex with a purple tinge. Palpi whitish; proboscis black, about one-third the eye-height. Thorax shining black, with a faint purplish reflection, pleuræ lightly pruinose. Halteres pale yellow. Abdomen black, with a bronze tinge. Legs and coxæ yellow, tarsi darker on the last joint. Wings cinereous-hyaline, unspotted, veins strongly fuscous, third and fourth veins straight, slightly divergent. 1.5 mm.

Guerrero and Vera Cruz (Mexico).

STILPON Loew.

Separated from *Drapetis* on account of the sides of the front being parallel, not triangular, and the arista dorsal, and not apical. The hypopygium in at least two of our species is very large, and its parts widely open.

Thorax shining black, hind metatarsi dark ..... 2.
Thorax cinerascent, legs yellowish ..... **Houghii** sp. nov.
2. Abdomen testaceous ..... **varipes** Loew.
Abdomen piceous ..... **pectiniger** sp. nov.

Stilpon varipes Loew.
Cent. II, 58.

Black, abdomen testaceous, halteres fuscous, wings infuscated, second and third sections of the costa subequal. Face white pollinose. Legs yellow, anterior femora strongly incrassate, apex of middle femora and outer half of posterior femora fuscous, anterior tibiæ beyond the base infuscated, posterior tibiæ fuscous, a little thickened at the tip; tarsi subfuscous, first joint fuscous, last joint black, hind metatarsi a little thickened. First longitudinal vein and first section of the costa testaceous, basal half of fourth vein weak, rest of veins fuscous, all the veins broadly bordered with fuscous, except second half of fourth and tip of fifth. 1.7 mm.

Pennsylvania (Osten Sacken).

Stilpon pectiniger sp. nov. (Figs. 4, 5).

Male. Length 1.5 mm.—Black. Eyes contiguous below antennæ. Front but little diverging towards vertex. Antennæ yellow at base, with several stout bristles, apical joint minute, fuscous, the long seta subdorsal. Palpi and proboscis yellow. Thorax shining, abdomen piceous and not shining, except hypopygium, which is very asymetrical, though smaller than in *Houghii*. Legs wholly yellow, except the hind metatarsi, which are incrassate, and the apical joint of tarsi; front femora thickened; hind femora above and below with a row of strong bristles, hind tibiæ inwardly and outwardly with a row of bristles, though these are not so closely placed, a little swollen at tip; middle tibiæ beneath at tip with several stout short bristles. All bristles are black. Knob of halteres elongate, well chitinized, punctulate, black, shining. Wings cinereous-hyaline, veins fuscous; first longitudinal and first section of costa not testaceous; veins not at all bordered with dusky coloration; fourth longitudinal ends at extreme tip of wing.

Two males; Milwaukee, Wis., VI, 26, 1895. New Bedford, Mass., V, 24, 1896.

This may prove to be the male of *varipes* Loew, though the piceous abdomen and lack of the dark color of the legs and unbordered veins, etc., are sufficient for specific differences in the present state of our knowledge.

Stilpon Houghii sp. nov. (Figs. 2, 3).

Male and Female. Length 2 mm.—Black, not shining. Head, thorax and abdomen cinereous dusted. Face and front cinereous, face broad in both sexes, front narrowed a little above antennæ. Antennæ short, third joint not minute though small, seta shorter than height of head, apical joint and seta infuscated. Proboscis short, thick, bent back, sordid yellow, dusky at apex; palpi sordid yellow. Thorax very bristly. Abdomen shining through the cinereous coating; hypopygium enormously enlarged, shining above. Legs yellowish, tarsi but little dusky towards tip; femora a little thickened, hind femora with a few macrochætæ on posterior surface; tarsi slender, hind metatarsi not thickened. Halteres yellowish, knob infuscated. Wings hyaline, with an opalescent tinge, nerves pale yellow; basal cells long, subequal.

Two males, one female; New Bedford (June), and Horse Neck Beach (August), Massachusetts.

I take pleasure in dedicating this curious insect to Dr. Garry de N. Hough, who has many times shown his generous spirit to all interested in Dipterology.

DRAPETIS Meigen.

Very small, shining, black or brownish, rather thick-set species. Antennæ two-jointed, shorter than the head; end joint short and rounded, with a simple terminal bristle. Proboscis short, vertical; palpi broadened, bristly at tip, shorter than the proboscis. Eyes narrowly separated in both sexes. Legs with fine pubescence; coxæ not lengthened; hind tibiæ generally ending on the posterior side in a more or less well developed brush-like process, forming a partial sheath around the base of the metatarsus. Third longitudinal vein not forked, no discal nor anal cell, first basal cell shorter than the second.

Legs mostly black.....2.
Fore femora more or less yellow.....5.
2. Halteres black; hind tibiæ with no bristles.....3.
Halteres white; hind tibiæ lighter, with several bristles on outer side.....4.
3. Third (fourth) abdominal segment large; fore tibiæ lighter; antennæ larger; veins stronger.....**nigra** Meigen.
Abdominal segments normal; legs uniformly dark; antennæ small; veins weak; hypopygium biparted.....**dividua** sp. nov.

4. Third antennal joint oval; hind tarsi and metatarsi with dense brush of yellow hairs on outer side ..... **nitida** sp. nov.
   Third antennal joint elongate; hind legs with no brush or with a small one of orange hairs ..... **medetera** sp. nov.
5. Yellow or reddish yellow; fourth abdominal segment black. **flavida** Williston.
   Thorax black, abdomen fuscous to black ..... 6.
6. Third and 4th longitudinals widely divergent; species less than 1½ mm. long....7.
   Third and fourth longitudinals at most subparallel, larger ..... 8.
7. Pile of thorax yellow; antennæ fuscous; halteres fuscous. **minuta** Williston.
   Pile of thorax black; antennæ black; halteres whitish..**divergens** Loew.
8. Halteres infuscated ..... 9.
   Halteres white ..... 11.
9. Posterior basal cell but little longer than anterior ..... 10.
   Second basal cell two times first; costa not thickened..**latipennis** sp. nov.
10. Abdomen fuscous, shining; antennæ yellowish; pleuræ yellowish; pleuræ yellowish; wings darker at base; legs light yellow. **pubescens** Loew.
    Abdomen mostly opaque black; antennæ infuscated; pleuræ black; wings uniform; legs darker; costa thickened between first and second veins; marginal cell at tip of first vein one half the width of submarginal; third and fourth longitudinals ending close together; wings with brownish tinge ..... **apicis** Williston.
11. Legs pure luteous ..... 14.
    Posterior femora dark in part ..... 12.
12. Posterior femora dark at apex, light at base; coxæ yellowish; hind metatarsi darker than other joints.
    Posterior femora reddish at tip, black at base; coxæ black; hairs of thorax intermixed with black; third and fourth veins subparallel; tarsi darker towards tip ..... **unipila** Loew.
13. Stout; 3d and 4th longitudinals converging ..... **femoralis** Wh. et M.
    Less robust; 3d vein straight ..... **septentrionalis** sp. nov.
14. Veins fuscous; posterior basal never as much as twice as long as anterior; 3d vein almost straight; hind metatarsi infuscated ..... 15.
    Veins faint; posterior basal about twice as long as anterior; 3d vein with a subapical anterior curve; metatarsi not dark..**spectabilis** sp. nov.
15. Third and fourth longitudinals subparallel; hind tibiæ simple; antennæ black; palpi lutescent ..... **gilvipes** Loew.
    First posterior cell a little narrowed in the margin; hind tibiæ with a short spur; antennæ and palpi infuscated..... **xanthopoda** Williston.

Drapetis nitida sp. nov. (Figs. 10, 14, 21).

Length 2–2.5 mm., wings same. Wholly shining black. Eyes contiguous below and narrowly above antennæ. Front not broad, triangular. Last antennal joint nearly oval, little longer than deep. Occiput not pruinose. Body with short sparse hairs, besides the black macrochætæ. Scutellum with two long bristles. Halteres whitish. Abdomen of male generally blunt, of female generally pointed, segments of subequal length; hypopygium small, shining, legs in

nature specimens totally black. Most of the specimens, however, show a tendency in the tarsi and posterior tibiæ to become lighter in color, even yellow. Legs rather short and stout, front femora thickened more than the others, posterior femora not lengthened, posterior tibiæ on hind apical third beset with a brush of golden hairs and produced to form a yellow sheath about posterior basal part of metatarsi. This ornamentation is variable in size, and generally more evident in the male. Wings cinereous hyaline, veins yellowish to brown, third and fourth subparallel at tip, in some specimens slightly converging, fourth generally attenuate at base.

Fourteen males, twenty-seven females; Monterey Co., Cal., July. Three males; Austin, Texas, March, October. One male; Granite Mountain, Texas, March 30th.

Drapetis medetera sp. nov. (Fig. 22).

Very similar to *nitida*, but readily distinguished by its smaller size and more slender legs. The posterior legs show less tendency toward the brown coloring, especially in the northern specimens, their brush is much reduced, sometimes wanting, and when present of a darker, orange color. The third antennal joint is two to two and one-half times its greatest width and pointed. Length 1.75–2 mm.

Six males, sixteen females; Idaho, Wyoming, Colorado, Arizona. A very unstable form.

Drapetis nigra Meigen (Figs. 12, 17, 24).

Four specimens from Brookings, South Dakota, do not disagree with Meigen's and others' descriptions.

The front is narrow, the eyes are subcontiguous for a long space beneath the antennæ, the hypopygium is much as in *dividua*, there are no thoracic macrochætæ, the scutellum has two apical bristles, the legs are largely piceous and the veins of the wings are strong. For the wing neuration see the figure

Drapetis dividua sp. nov. (Fig. 16, 18, 23).

Length 1.25-1.5 mm.—Obscure black. Antennæ black, third joint cordate, arista nearly two times length of antenna. Eyes narrowly separated above and below antennæ. Proboscis one-half head height, fuscous; palpi piceous, with golden hairs, rather broad. Front narrow. Occiput, thoracic dorsum and abdomen moderately shining, covered with dusky hairs; thorax without macrochætæ, scutellum with two moderately long and several shorter bristles; pleuræ shining, not metallic. Halteres black. Hypopygium horizontally cleft, covered with stiff dusky hairs at base and black ones at tip, the upper portion erect, the lower larger part terminal. Legs black, the tarsi sometimes lighter; none of the femora greatly thickened, no macrochætæ, no brush nor spur on hind tibiæ, hind femora not much bent, hind metatarsi not enlarged, a little compressed. Wings clear hyaline, costa not thickened, marginal cell at tip of first vein twice as wide as submarginal, third longitudinal vein ending much before apex of wing, fourth ends at apex, second basal a little longer than first, third and fourth longitudinal veins slightly diverging, anal angle rather full.

Twenty-five specimens. Moscow, Idaho.

Apicis, niger and *dividua* are quite similar at first sight. Moreover, they constitute a group having the hypopygium cleft.

Drapetis latipennis sp. nov. (Figs. 11, 19).

Length 1.5-2 mm.—Black, shining; legs yellowish brown. Front moderately narrow; vertex and occiput shining, beset with dusky hairs. Eyes narrowly separated below antennæ. Proboscis black, pointed, palpi piceous, with grayish hairs, broad, mouth-parts very small. Antennæ short, piceous; third joint equal to second, flattened above, arista long. Thorax large, shining, black, notum with sparse dusky hairs, no macrochætæ; pleuræ very shining, with no hairs nor pollen; scutellum with two apical bristles; halteres piceous. Abdomen fuscous to black, hairy, segments regular, in the male segments five and six have a slightly whitish cast, in the female segments four and five have whitish borders sometimes; hypopygium not wider than abdomen; anal segments of female black. Front coxæ and femora luteous, middle and posterior coxæ and trochanters piceous, remainder of legs sordid yellow, tarsal joints not darker apically, hind legs as far as second tarsal joint sometimes more or less dark; hind tibiæ with a very small spur on posterior side and a few yellowish hairs near tip. Wings hyaline, broad, anal angle full, second vein terminates nearer first than third, marginal cell at tip of first vein three times the width of submarginal at that point, second basal cell broad, about twice as long as first, third and fourth longitudinals diverging and then subparallel, first posterior cell not narrow in the wing margin; veins not broad, though piceous.

Two males and three females; Lawrence, Kansas. One male; Milwaukee, Wis.

Drapetis apicis Williston.

Trans. Ent. Soc. Lond., 1896, iii, p. 442.

Antennæ brown, third joint small, onion-shaped. Front black, not shining. Eyes contiguous on face. Thorax black, mesonotum moderately shining, scutellum with two bristles; abdomen nearly opaque black. Legs brown, front coxæ, basal part of all the femora, hind tibiæ in part, and the proximal part of the four posterior tarsi yellowish. Front femora thickened on the proximal portion, the under border straight; middle femora less thickened, hind femora rather slender. Wings nearly uniformly tinged with brown; second and third sections of the costa subequal; third and fourth veins nearly parallel, the third terminating at the extreme tip; penultimate section of fourth vein about twice the length of the posterior cross-vein. Palpi, proboscis and halteres brown. Front and hind tibiæ without spurs. Length 2 mm.

St. Vincent, West Indies.

In addition to the characters given in the specific diagnosis, the following will help to distinguish this species from *dividua*:

Costa thickened between first and second veins; marginal cells at tip of first vein one-half the width of the submarginal cell at that

point; third and fourth longitudinal veins ending close together; anal angle not strongly developed.

The antennæ are very small and the wings have a brownish tinge.

Drapetis pubescens Loew.

Cent., ii, 57.

Black, shining. Head black, shining, the hairs of the vertex fuscous. Antennæ dull yellow, the third joint and the seta sub-fuscous. Palpi dark fuscous. Dorsum of the thorax black, shining, covered with short and dense whitish pubescence. Pleuræ very pale yellow, the upper third fuscous, spotted with black. Abdomen dark fuscous, with very short pale pubescence; base of the abdomen often yellowish; ovipositor of the female longer than in the majority of the species, bent somewhat downward, black, the apex brownish. Legs whitish, with short whitish pubescence, the posterior tibiæ bearing a little longer pile above. Halteres fuscous. Wings hyaline, with a gray tinge, the basal third infuscated slightly, the fourth vein sub-arcuate, basal cells equal. Length 2 mm.

New York.

Drapetis divergens Loew (Fig. 15).

Cent. x, 62.

Black, shining. Antennæ short, black, the first two joints a little less black, often fuscous, in immature specimens even reddish. Palpi moderately broad, whitish. Hair of the vertex whitish. Thoracic dorsum closely clothed with short and somewhat appressed white pubescence, and provided above the wings with some pale yellowish hair, blackish by transmitted light. Abdomen black and shining, in immature species whitish toward the base, but the hind margins of the segments always black. Front coxæ wholly, the others, except the base, yellow. Legs yellow, the tarsi almost wholly fuscous; hind femora thicker than the middle ones, front femora thicker than the hind ones, all destitute of any long hair, except the subapical hair of the middle femora; no apical setulæ on the anterior tibiæ; apex of the hind tibiæ simple. Halteres whitish. Wings hyaline, veins yellowish toward the base, otherwise fuscous; the first vein is so little curved, and the second so strongly arched, that the second section of the costa is very short; third longitudinal vein slightly bent, the first portion more strongly recurved than the outer, so that the vein joins the costa far from the apex of the wing and in a rather sharp angle; third and fourth veins strongly diverging toward the apex; posterior basal cell much longer than the anterior. Length 1 mm.

Texas, Alabama, Georgia, New Mexico.

Drapetis minuta Williston.

Trans. Ent. Soc. Lond., 1896, iii, p. 442.

Eyes of male closely contiguous above and below the antennæ. Vertical triangle and occiput black, whitish pruinose. Antennæ light yellow; third joint as long as the first two together, half longer than wide. Thorax black; mesonotum shining, clothed with dark hair. Scutellum with two bristles. Abdomen black, moderately shining. Legs light yellow; all the femora moderately thickened, the front pair more so than the others. Wings nearly hyaline; second vein

deeply concave anteriorly; third vein widely divergent from the fourth, the first posterior cell widely open.

A cotype specimen measures 1.3 mm.

St. Vincent, West Indies.

Drapetis unipila Loew.

Cent. x, 60.

Black, very shining. Antennæ concolorous, the third joint short and ovate. Palpi almost black. Thoracic dorsum provided with short cinereous pile and some scattered longer black hairs. Abdomen black, the second segment, except the apical margin, and the third sometimes at the base, dull whitish. Trochanters reddish-brown. Femora black, except the reddish apex, the front ones strongly thickened towards the base, the hind ones moderately thickened, middle femora not thickened: all the femora provided at the base below with a single hair, the hind one, however, finer and more difficultly seen; moreover, the front femora bear on each side, the middle ones on the front side, a subapical hair, the hind femora bear on the forward side two long hairs, one subapical, the other a little more distant from the apex; the anterior tibiæ beyond the reddish base often fuscous and provided with apical setulæ; hind ones badious or reddish, above, except the base and apex, often fuscous and there armed with the long hair, much further from the apex than from the base; apex of the hind tibiæ dilated, so that the tarsus is inserted not at the apex but a little before it. Anterior tarsi dark brown, toward the base often reddish, hind ones reddish; last joint blackish always, the three preceding often fuscous. Halteres whitish. Wings hyaline, veins pale yellowish brown; first and second longitudinals moderately and evenly curved, the third meeting the costa a little before the apex of the wing, slightly sinuous over all and slightly incurved toward the apex, fourth slightly sinuous, and almost parallel with the third; posterior basal cell much longer than the anterior. Length 2 mm.

Texas.

Drapetis femoralis Wheeler et Melander (Fig. 13).

Biol. Cent.-Am. 1901. Dipt. Suppl. p. 375.

Shining black; front and proboscis black; anteunæ and palpi fuscous; front broad; halteres whitish; legs yellowish brown, four anterior femora darker above, hind femora darker on distal half, tarsi darker, especially hind metatarsi, which are equal in length to the remainder of the tarsus; hind tibiæ with a short thick terminal spur; wings grayish, veins strong, brown, third and fourth veins gently curved towards each other near the tip, posterior basal cell twice the length of the first. 2 mm.

Mexico, Vera Cruz and Tabasco.

The scutellum has four fine marginal hairs. On the outer side the hind tibiæ have a strong preapical bristle. The pubescence of the thorax is white.

Drapetis septentrionalis sp. nov.

Very similar to the preceding, but differs in its much smaller, more graceful stature. The hairs of the thorax are less conspicuous, dusky and white inter-

mixed; the marginal bristles of the thorax are stouter and likewise the two on the scutellum. The spur of the hind tibiæ is much reduced. The third and fourth longitudinal veins are straight and diverge but very slightly; the first basal cell is three-fourths as long as the second. Length 1.5 mm.

A single male; Battle Creek, Michigan (J. M. Aldrich).

Drapetis spectabilis sp. nov. (figs. 9, 20).

Length 2–2.5 mm. Very similar to *xanthopodus* Williston, differing as follows:

spectabilis.	**xanthopodus.**
Eyes almost touching just above antennæ.	Eyes wholly separated above.
Arista once and a half antenna.	Arista three times antenna.
Thorax prominent in front.	Thorax globose.
Scutellum with two long bristles.	Scutellum with four long bristles.
Abdomen depressed.	Abdomen subcylindrical.
Wings hyaline.	Wings cinereous hyaline.
Nerves flavous.	Nerves saturate fuscous.
First posterior wider in margin than at tip of first vein.	First posterior narrower in margin than at tip of first vein.
Second basal twice first.	Second basal shorter.
Third vein sinuous.	Third and fourth subparallel.
Marginal wider than submarginal cell.	Marginal not wider than submarginal.
Hind femora not strongly curved.	Hind femora bowed, more robust.
Hind tibiæ with no subapical bristles.	Hind tibiæ with two subapical bristles on outer side.
Hind tibiæ with three long hairs on outer side proximally.	Hind tibiæ without these.
Metatarsi not dark.	Hind metatarsi darker than rest.

Both species possess a small though well-marked brush of yellow hairs on inner side of posterior tibiæ.

Five males, seven females; Woods Holl and Horseneck Beach, Massachusetts, July–August.

Drapetis xanthopodus Williston.

A specimen from Georgia very closely resembles the type from the Island of St. Vincent, West Indies. The thorax is less brilliant, however, and the legs are more dusky.

One specimen; Galveston, Texas.

In this connection may be noted a slip of the pen in the appendix to Dr. Williston's "Diptera of St. Vincent." *Xanthopodus* is there called *flavipes*, its manuscript name (not *flavipes* of Macquart), and *flavidus* is called *xanthopodus*.

Drapetis gilvipes Loew.

Cent. x, p. 61.

Black, very shining. Antennæ black, shorter than in *unipila;* third joint short and round-ovate; seta very long. Palpi dull yellow. Thoracic dorsum covered with short blackish pubescence; except for the sides and hind margin, devoid of longer black pile. Pleuræ provided with no pollen at all, very shining. Abdomen black and shining, the second, third and fourth segments of the described specimen dusky whitish, the hind margin of each black; in older specimens, perhaps, the whole abdomen is black. Legs, together with the coxæ, strong yellow, the hind metatarsi and the apex of all the tarsi fuscous or almost black. Middle femora stronger, but not thickened, the other femora moderately and evenly thickened. Front and middle tibiæ armed with apical setulæ; apex of the hind tibiæ simple. Halteres whitish. Wings cinereous, veins dark fuscous; first and second veins but very little curved, the third vein nearly straight, meeting the costa a little before the apex of the wing, fourth subparallel with the third, not undulating, the apical third of its last segment, however, bending back slightly; posterior basal cell longer than the anterior. Length 1.3 mm.

Texas, Bosque Co.

Drapetis flavida Williston.

Trans. Ent. Soc. Lond., 1896, p. 308.

Yellow or reddish yellow; head and the fourth abdominal segment black. Occiput, vertical triangle and the front black. Eyes contiguous below the antennæ, subcontiguous above. Antennæ yellow, the third joint sometimes brownish. Thorax reddish yellow, mesonotum shining, with light colored hair and bristles; hind tibiæ in the male with a stout curved spur at the tip; hind femora less thickened than the middle ones; the front pair considerably thickened. Wings hyaline; the outer portions of the third and fourth veins parallel or very slightly divergent. Length 2–2.5 mm.

St. Vincent, Hayti, Vera Cruz, Orizaba, Yucatan, Louisiana.

ELAPHROPEZA Meigen.

Small, *Platypalpus*-like species. Antennæ apparently two jointed, the end joint lengthened, with a long arista. Proboscis shorter than the head, vertical; palpi shorter than the proboscis. Face narrow, vertex a little broader. Legs but little thickened. Wings with unforked third vein and with no discal nor anal cell; cross-veins approximated.

But one species in our fauna. The genus was not discovered on this continent before.

Elaphropeza montana sp. nov. (figs. 7, 8).

Length 2 mm. Black, shining. Eyes contiguous below the antennæ. Proboscis small, black, palpi lutescent. Antennæ yellow or fuscous at the base, third joint lanceolate, conical, black, bearing a short, stout, terminal arista, whose

length equals the third joint. Vertex shining, sides of face nearly parallel; occiput a little pruinose. Dorsum of thorax, pleuræ and abdomen very shining, black; notum devoid of bristles or hairs, though all the specimens may be rubbed; scutellum with two fine, dusky bristles. Hypopygium small, appendages concealed. Legs, including the coxæ, yellow, last joint of tarsi black; legs slender, tibiæ spurless, no bristles, except the small setulæ on the under side of the middle femora—as in *Platypalpus*. Halteres small, whitish. Wings clear hyaline, veins light fuscous, not thick; first basal very little longer than the second, almost its equal in length; third and fourth longitudinals straight, parallel on outer portion; no trace of an anal cell; anal angle not prominent, rounded.

Eight males and one female; Colorado, C. F. Baker.

The structure of the middle legs is very much like that of certain *Platypalpus*.

PLATYPALPUS Macquart.

Rather small flies, the largest species measuring but 4 mm. Body generally black, with yellowish legs. Wings not spotted. Antennæ apparently two-jointed, with a terminal arista. Proboscis shorter than the head. Eyes of both sexes separated on the vertex. Hypopygium not large, forming a rather blunt ending to the abdomen. Front and middle tibiæ much thickened, generally with spines beneath. The middle tibiæ ending in a spur. Wings with the third vein unforked, all the cross veins near the middle of the wing, no discal cell, anal cell present, its cross-vein perpendicular to the wing margin, sixth vein abbreviated more or less basally.

The generic names *Platypalpus* and *Tachydromia* are chosen, not because they are believed the correct solution of an entomological controversy, but rather because most of the North American species have been described under them.

Femora more or less black ..... 2.
Femora wholly yellow ..... 8.
2. Front tibiæ incrassate ..... 3.
Front tibiæ not incrassate ..... 4.
3. Large species ..... **trivialis** Loew male.
Small species ..... **pachycnemus** Loew.
4. All the tibiæ black ..... **monticola** sp. nov.
Tibiæ more or less yellow ..... 5.
5. Third antennal joint short, oval ..... 6.
Third antennal joint lengthed, lanceolate ..... **pluto** sp. nov.
6. Second basal cell considerably the longer ..... **incultus** Coquillett.
First and second basals subequal ..... 7.
7. Femora with a well-marked black dot; tibiæ yellow ..... **apicalis** Loew.
Anterior femora black above, the others black apically; tibiæ black apically (Alaska) ..... **diversipes** Coquillett.

8. Thorax yellow in large part ..... 9.
Thorax wholly black ..... 15.
9. Head black ..... 11.
Head yellow ..... 10.
10. Head narrow ..... **tersus** Coquillett.
Head broad ..... **flavirostris** Loew.
11. Thorax with black vitta ..... 12.
Thorax with no vitta ..... 13.
12. Proboscis mostly yellow ..... **mesogrammus** Loew.
Proboscis black; wings elongate ..... **caligatus** sp. nov.
13. Front femora somewhat thickened ..... 14.
Front femora not thickened ..... **flavirostris** Loew.
14. Proboscis wholly black ..... **lætus** Loew.
Proboscis yellow at base ..... **impexus** sp. nov.
15. Legs slender, femora subequal ..... **vicarius** Walker.
Middle femora at least enlarged ..... 16.
16. Tibial spur wanting; posterior cross-vein nearly perpendicular ..... 17.
Spur of middle tibiæ present; cross-vein oblique ..... 19.
17. Abdomen wholly shining; thoracic bristles yellow ..... 18.
Abdomen pollinose; some bristles black ..... **canus** sp. nov.
18. Mouth-opening very large ..... **hians** sp. nov.
Mouth-opening normal ..... **inops** sp. nov.
19. Antennæ wholly black ..... 20.
Antennæ in part yellow ..... 25.
20. Tarsi strongly annulate ..... 21.
Tarsi uniform or at most weakly annulate ..... 22.
21. Third antennal joint long, lanceolate ..... **æqualis** Loew.
Third antennal joint short, oval ..... **trivialis** Loew female.
22. Both third and fourth veins subparallel with axis of wings, abdomen not pollinose ..... 23.
Either third or fourth sinuous, bending backwards; abdomen pollinose. **incurvus** sp. nov.
23. Hind metatarsi yellow, at extreme tip dark ..... 24.
Hind metatarsi uniformly dusky ..... **gravidus** sp. nov.
24. Species 2 mm. long, wing 2 mm., arista equal to antenna... **hastatus** sp. nov.
3 mm. long, wings 5 mm., arista longer than antenna... **caligatus** sp. nov.
25. Proboscis black ..... 26.
Proboscis yellow ..... **tenellus** sp. nov.
26. Front end of pleura to the posterior side of the front coxæ, also lateral margins of the metanotum, encroaching slightly on the pleura, opaque, gray pruinose (Alaska) ..... **gilvipes** Coquillett.
The smooth "plaga" much reduced in size ..... 27.
27. Sixth vein not obsolete at the base ..... 28.
Anal cell incomplete; tarsi annulate ..... **crassifemoris** Fitch.
28. Middle tarsi of the male black, the front tarsi whitish, of the female all the tarsi annulate ..... **discifer** Loew.
Tarsi more uniform ..... **lateralis** Loew.

Platypalpus trivialis Loew (Figs. 26, 34, 43).

Cent. v, 76.

Two males among a lot of *Platypalpus* taken by Dr. Garry de N. Hough on June 12th at New Bedford, Mass., are presumably associated with a large female taken at the same time. The female is evidently the same form as was described by Dr. Loew as *trivialis*. If these males are the other sex of *trivialis*, we have another case of great sexual dimorphism.

Male.—Length 3.5 and 4.5 mm., wings same. Middle and front femora black, except apical fourth; front femora ciliate, with long white hairs beneath; front coxæ black, middle ones piceous, hind ones dusky; front tibiæ even larger than in the female; scutellar bristles rather small in comparison with the size of the species; humeri more conspicuous than usual; hypopygium not large, rounded, with a small stiff fringe of yellow hairs on the left side; under side of second basal cell strongly sinuous; first posterior cell quite wide in its third quarter; costa thickened at insertion of first vein.

The male differs from *pachycnemus* Loew in being double the size. Aside from the following points the description of *pachycnemus* will answer for this species:

Antennæ black; posterior femora wholly yellow; anterior femora strongly incrassate; tibiæ wholly yellow; tarsi yellow, apex of each joint sharply black, the amount of black increasing on the distal joints; anal vein rather strong.

The front femora of the female of *trivialis* are not ciliate, the other femora not blackened, and the second basal not strongly sinuous.

D. C., Maine (O. Sacken).

Mr. Coquillett claims to have received this species from Santa Fé, New Mexico, from Mr. Cockerell.

Platypalpus caligatus sp. nov. (Figs. 27, 35, 46).

The discovery of the male of *trivialis* shows that the insect mentioned in the Biologia Centrali-Americana as related to *trivialis* must be a distinct form. The points of difference are:

Male.—Length 3 mm., wing 5 mm. Legs, including coxæ, yellow, front femora and tibiæ less thickened; cilia of lower occiput, coxæ and femora shorter and fewer in number; tarsi not annulate; scutellar bristles black; hypopygium smaller and with a longer yellow fringe on left side; venation weaker, underside of second basal straight; sides of first posterior cell less sinuous, anal angle less prominent.

Female.—Size of body and of wings as in male. Tarsi not annulate; thoracic macrochætæ black; anal angle rounded, third and fourth longitudinals less sinuous.

One male, three females; Omilteme and Amula in Guerrero, Mexico. Alt. 6000–8000 feet. July, August, September.

The peculiar variation shown by one specimen may be mentioned again. This individual, apparently the most mature, has the side of the mesonotum and the pleuræ luteous, a curious departure from the usual black thorax. This specimen has also the base of the third vein and the underside of the second basal cell very strong.

Platypalpus pachycnemus Loew.

Cent. v, 77.

Black, shining, dorsum of thorax and scutellum opaque, with cinereous pollen. Antennæ fuscous, third joint short, ovate. Coxæ light testaceous, darker basally, femora piceous, apex of all and upper side of the posterior pair testaceous, anterior and middle tibiæ fuscous, anterior tibiæ incrassate, lighter at base and beneath, middle tibiæ with a large spur, posterior tibiæ yellowish, darker at tip; middle tarsi black, posterior tarsi testaceous at base, darker at apex, front tarsi darker at base than at apex. Third longitudinal vein incurved, converging with fourth.

District of Columbia (Osten Sacken).

In the shorter diagnosis Dr. Loew mentions that the first basal cell is the longer. This error is corrected in the main description.

Platypalpus monticola sp. nov. (Fig. 41).

Black, not shining, head and thorax covered with grayish white pollen. Face and front broad, gray pollinose. Antennæ black, third joint defective. Palpi black, with gray hairs; proboscis black, two-thirds the height of the head. Thoracic bristles yellow; scutellum with two long, yellow, terminal bristles. Abdomen and hypopygium shining, black. Halteres reddish. Legs firm, but not much thickened, front femora but little thicker than hind ones, middle femora a little stronger, front tibiæ not incrassate, spur of middle tibiæ moderately strong. Whole of legs black, except the brownish knees. Wings cinereous-hyaline, veins firm, fuscous, third and fourth parallel, nearly straight; second basal cell the longer, its outer vein oblique; anal vein almost wholly gone.

Male and female. Length 1.5–2.5 mm.

Four specimens; Colorado and Cameron Pass, Colorado, July 31st; 11,800 feet.

The only species yet found with black tibiæ.

Platypalpus pluto sp. nov. (Fig. 39).

Black. Antennæ black, third joint lanceolate, lengthened, arista equal to length of the antenna. Face rather narrow, grayish; front moderately gray-brown pollinose; occiput but little shining. Palpi and proboscis small, black. Thorax moderately shining, gray-brown pollinose on dorsum and gray on pleuræ, except usual smooth intercoxal space; its macrochætæ black; scutellum with two terminal bristles. Knob of halteres yellowish white, first joint of pedicel infuscated. Abdomen shining; hypopygium shining, not large; last two seg-

ments of female abdomen not shining, with fuscous hairs, styles short. Coxæ black, front ones anteriorly and middle ones on outer surface with whitish hairs and bristles; all femora black, except reddish at knees; middle femora moderately thickened, front femora less, hind ones not at all; tibiæ reddish, spur on middle ones moderate; tarsi blackish, except dusky at extreme base. Wings hyaline, with faint brownish tinge; veins strong, fuscous, anal vein usually obsolete at base; second basal cell the longer, its outer vein oblique, first posterior cell broadest in the middle, converging towards ends. In the female there is usually a coalescence for a greater or less distance of the costa and first longitudinal. Length 2–2.25 mm.

Sixteen males and eleven females; San Diego Co., California, March.

Seven specimens from Juliaetta, Idaho, appear to belong to this species. The veins are weaker, the legs less strongly black, and the palpi dusky. One female; Albion, Idado (J. M. Aldrich).

Platypalpus apicalis Loew.

Cent. v, 79.

Black, shining. Head less shining, face closely white pollinose. Antennæ black, the third joint short ovate, the base narrowly luteous. Proboscis black; palpi whitish. Side margins of the thorax and the pleuræ very obsoletely white pollinose, moderately shining. Abdomen shining. Legs, together with the coxæ, yellow, the last tarsal joint black, front and hind femora above marked with an ovate black spot; front femora moderately thickened, middle femora a little thicker than the front ones, with short black hairs below; the apical tooth of the middle tibiæ short. Wings hyaline, veins fuscous, toward the base yellowish, the third and fourth longitudinal veins parallel; first basal cell equal to or a little longer than the second; the posterior basal cross-vein complete; sixth vein abbreviated toward the base. Length 2.2 mm.

Pennsylvania. Common at Wood's Holl, Mass.

Platypalpus diversipes Coquillett.

Proc. Wash. Acad. Sci. vol. ii, 1900, p. 422.

Black, palpi and halteres whitish, legs yellow, bases of coxæ, upper side of the front femora, broad apices of the other femora, of tibiæ, and whole of tarsi, except base of first joint, black; third joint of the antennæ only slightly longer than broad; front femora considerably thickened, about two-thirds as thick as the middle ones; first and second basals subequal, veins yellowish brown. Length 1.5 mm.

Alaska (Kincaid).

Platypalpus incultus Coquillett.

Proc. Nat. Mus. 1896, p. 439.

Black, shining, including the pleuræ. Front coxæ yellowish, others black; front and middle legs yellowish, upper and lower sides of femora blackish brown; tarsi and hind legs, except bases of tibiæ, blackish brown; front femora slightly thicker than the others, middle femora scarcely as thick as the hind ones; legs

destitute of long bristles or pile. Knob of halteres yellow. Veins brown; second basal longer than first by three times the cross-vein at the end of the first. 2 mm.

Southern California; Texas (Brues).

Platypalpus tersus Coquillett.

Proc. Nat. Mus. 1896, p. 439.

Yellow, except eyes and arista black. Third antennal joint short, oval. Front femora twice as thick as the hind ones, middle femora one-half thicker than the front ones. Third and fourth veins parallel, second basal longer than the first; sixth vein obsolete on basal fourth. Length 2-3 mm.

Georgia and North Carolina (Coquillett); Georgia and Louisiana (Pilate).

Platypalpus impexus sp. nov.

Related to *tersus* Coq. and to *lætus* Loew. The following are its distinctive characters:

Head black, yellow-pollinose. Thorax not shining, closely covered with yellowish tomentum. Proboscis yellow, infuscated apically. Pleuræ closely yellow tomentose; the usual clear space is rather small. Front and middle femora subequal, twice as thick as hind femora, middle femora with much reduced spines and with yellowish hairs. Spurs of middle tibiæ smaller than in the allied forms; apex of each tarsal joint narrowly but distinctly black. The fourth vein is slightly sinuous and bends back at the tip, so it there diverges slightly from the third.

One female; Brookings, South Dakota. One female; Battle Creek, Michigan.

Platypalpus lætus Loew.

Cent. v, 81.

Yellow, shining, head cinereous; proboscis black; third joint of antennæ and tarsi piceous; spur of middle tibiæ rather large. Wings yellowish, veins yellow, third vein straight, fourth vein lightly curved towards third; first basal cell a little shorter than the second. Length 2.2 mm.

New Hampshire (Osten Sacken).

Platyaplpus flavirostris Loew.

Cent. v, 80.

Yellow, reddish above, shining, head cinereous, proboscis yellow, last joint of the antennæ black, last joint of the tarsi fuscous, except at base; apical spur of middle tibiæ small. Veins pale yellow, third vein very slightly curved towards the fourth; basal cells equal, sixth vein not obsolete at base. Length 2.6 mm.

New Hampshire (Osten Sacken).

Platypalpus mesogrammus Loew.

Cent. iii, 38.

Yellow, shining. Antennæ, palpi and proboscis, except tip, yellow. Head black. A median thoracic vitta rufescent. Scutellum, except lateral angles and

abdomen, black, shining. Wings hyaline, third and fourth longitudinal veins parallel, straight. Length 1.5 mm.

New Jersey, Pennsylvania, District of Columbia, Tennessee.

Platypalpus vicarius Walker.

Trans. Ent. Soc. Lond., N. Ser., iv, p. 149.

"Black, shining; legs testaceous, slender, nearly equal in size; wings limpid, veins testaceous, externo-medial veins very slightly curved." Length 2 mm.

"United States."

Platypalpus canus sp. nov. (Figs. 29, 40, 45).

Length 1.5–2 mm. Head black, base of antennæ, proboscis and palpi yellow; third antennal joint short, more or less fuscous, arista black, equal to antenna; proboscis a little shorter than head-height. Face narrow. Thoracic bristles mostly black; scutellum with two long bristles. Head, thorax and abdomen with slaty pollen, pleuræ completely covered. Halteres pale yellow. Hypopygium piceous, its outer parts freer than usual. Legs, including coxæ, yellowish, tarsi dusky apically, femora slightly thickened, front and middle subequal, hind femora not thickened, front tibiæ incrassate, compressed, a little more slender than the front femora, middle femora beneath with no setulæ, but with dusky setæ, middle tibiæ with no setulæ nor terminal spur. Wings clear, veins light fuscous, anal angle not prominent, anal cell open, second and third veins nearly parallel, posterior cross-vein nearly a continuation of the anterior.

Thirteen specimens; Los Angeles Co., California, December.

Platypalpus hians sp. nov. (Figs. 32, 36, 37).

Length 2–3 mm. Black, shining where tomentum is rubbed. Head, thorax and pleuræ with gray-green tomentum. Face moderately broad, gray pollinose. Proboscis about one-half the head height; palpi short, whitish. Mouth-opening large, as in the Ephydridæ. Antennæ short, basal joint reddish yellow, apical joint lanceolate, pointed, its arista equal to itself. Postocular and thoracic bristles yellow; all on scutellum moderately long. Halteres reddish yellow. Abdomen black, with a greenish reflection, as in also the pleural plaga. Hypopygium rounded. Legs, including front coxæ, reddish; tarsi piceous from tip of first joint, middle and hind coxæ concolorous with pleuræ; femora moderately thickened, middle ones the most, black, setulæ of middle femora prominent, middle tibiæ two-thirds the length of femora, front tibiæ not incrassate. Wings clear, anal angle moderately prominent, veins narrow, fuscous, lighter at base, third and fourth subparallel, first and second basals equal, posterior cross-vein nearly perpendicular to wing margin, anal cell faintly closed.

One male and three females; Colorado.

Platypalpus inops sp. nov.

Closely related to *hians*, but readily distinguished by the following characters:

Face narrow, gray-white pollinose; front narrow. Palpi narrower, longer, pinkish to reddish. Mouth-opening not large. Antennæ black, plainly 3-jointed, arista longer than antenna, third joint short, ovate, blunt. Legs lighter, of a

purer yellow color, tarsi generally markedly annulate; middle tibiæ with a trace of an infuscation at tip. The middle tibiæ are nearly the length of the femora. Scutellar bristles shorter, especially the lateral ones. Anal angle of wing less prominent, anal vein stronger, and anal cross-vein more oblique. The rest of the neuration is the same.

Seven specimens; Dubois (7200 feet altitude), and Hunter's Creek, Wyoming, September 6–10, 1895 (Wm. M. Wheeler); Oxford, Idaho (J. M. Aldrich).

Platypalpus incurvus sp. nov. (Figs. 31, 33, 44).

Length 2–2.5 mm. Head, thorax and abdomen black. Proboscis short, black; palpi white to piceous. Antennæ elongate, black, third joint lanceolate, arista its equal. Face narrow, white to whitish. Vertex and thoracic dorsum with green-brown dust merging to slaty below and on abdomen. Upper portion of occiput with black bristles, lower with white ones; thorax with black bristles. Halteres yellow. Basal half of each abdominal segment with a coating of slaty dust, outer half shining. Hypopygium terminal or flexed to the right, small to moderately large, with a fringe of yellow hairs on left side. Legs light yellow; tarsi slightly dusky, a little darker at tip of each joint, sometimes almost annulate; legs slender, front femora but little thickened, a little larger than front tibiæ, which are enlarged and slightly compressed. Wings clear, nerves weak to brown; second basal a little the longer, anal vein generally moderately strong, sometimes the third vein is parallel with the costa, sometimes both the third and fourth are reflexed at the tip, meeting the wing margin beyond the apex of the wing.

Twenty specimens, the males predominating; Los Angeles Co. and San Diego Co., California, December and February.

It seems quite probable that this species is in a state of division. As a general rule the smaller hypopygium, weak venation, straighter third vein and light-colored palpi are correlated, but this is not universally true.

Platypalpus gravidus sp. nov. (Figs. 25, 42).

Black, except legs, wings and halteres. Face grayish, moderately narrow. Palpi dusky red; proboscis a little shorter than head. Third antennal joint lanceolate, in length equal to its arista. Thoracic bristles black. Abdomen shining, with sparse whitish hairs; hypopygium not large. Pleuræ slaty, with usual plaga. Legs yellow-testaceous, front coxæ more or less black at base, other coxæ varying from yellow to black; all the tarsi largely, evenly, dusky to piceous; front femora moderately, middle more strongly, hind not, incrassate; spur of middle tibiæ moderate, black at tip. Wings with browish tinge, veins fuscous, strong; third vein straight, except extreme tip, first posterior cell a little wider in the middle, narrower just before apex, second basal cell longer than the first, its outer vein oblique, anal cell open behind. Average length 2.5 mm.

Sixteen males, thirty females; San Diego Co., California, February and March.

Platypalpus lateralis Loew.

Cent. v, 78.

Black, shining. Head subopaque, cinereous. Antennæ black, third joint short, lanceolate, yellow basally. Proboscis black, palpi black. Sides of thorax and greater part of pleuræ opaque white pollinose. Abdomen shining black. Legs including coxæ yellow; tarsi annulate basally, fuscous or black apically, apical spur of the middle tibiæ small. Wings hyaline, veins fuscous, third and fourth subparallel, basal cells equal, sixth vein whole. 2.5 mm.

New Hampshire (Osten Sacken).

Platypalpus discifer Loew.

Cent. iii, 36.

Black, shining, dorsum of thorax, scutellum and metanotum with luteous pollen, occiput and pleuræ with opaque white pollen. Antennæ ochraceous, black at tip. Palpi and legs yellow. Anterior tarsi of male white, and closely white pubescent, middle tarsi of male black, first joint depressed; posterior tarsi of male and all the tarsi of the female black apically. Wings subinfuscated, base of costa and first longitudinal lutescent, rest of veins strong, dark fuscous, third and fourth veins convergent, anal cell complete. 2.6 mm.

District of Columbia (Osten Sacken).

Platypalpus hastatus sp. nov. (Fig. 30).

Black, head and thorax dusted with olive-green tomentum. Face narrow, white dusted, the dust with a slight yellowish shade. Antennæ piceous to black, third joint broad, one and one-half times as long as deep, it height equalling the length of the first joint, arista shorter than antenna. Palpi small, whitish in the male, yellowish red or fuscous in the female. Proboscis black, a little shorter than height of head. Lower part of occiput and of pleuræ slaty-gray pollinose. Scutellum with two long apical yellow bristles. Halteres whitish, broad. Abdomen black, shining, with sparse, short, light-colored hairs; hypopygium shining, flexed to the left, large; genital styles of the female fuscous; venter shining. Legs including coxæ yellow, tarsal joints slightly dusky apically; front coxæ with coating of white hairs anteriorly; femora not greatly thickened, middle ones largest, hind femora not thickened; spur of middle tibiæ moderate. Wings clear, veins light yellow, third and fourth longitudinals nearly straight, subparallel, second basal cell the longer, its outer vein oblique, anal cell open behind, sometimes wanting. 2–2.5 mm.

Four males and six females; Lawrence, Kansas. One female from Craig's Mountain, Idaho.

Platypalpus æqualis Loew.

Cent. v, 75.

Black, shining. Dorsum of thorax with cinereous pollen, pleuræ largely opaque white. Legs and coxæ yellow, tarsi yellow. Antennæ black, third joint lanceolate. Palpi testaceous. Basal cells of wing equal, sixth vein not abbreviated at base, third vein very slightly incurved at apex, subparallel with the fourth. 2.5 mm.

Illinois (Le Baron).

Specimens have been examined from Mass., Mich., Ill., Wisc., La., Neb., Kans., So. Dak., Colo., Wyom., Idaho, N. Mex., Calif., Mexico.

Among these specimens, which doubtless are of a single form, the variations are extreme. Sometimes the tarsi are pure yellow, more often sharply annulate, though at times they are dusky. A few of the specimens from Wyoming have almost black feet. The legs vary from reddish brown to almost white. At times the two basal cells of the wings are equal, more often the second is the longer. The sixth vein is more or less abbreviated at the base. The face varies from white to red or fuscous, and varies also greatly in breadth. The last antennal joint is generally lanceolate, but frequently is short.

Platypalpus crassifemoris Fitch.

Oscinis crassifemoris Fitch, N. Y. Reports, vol. i (1856), p. 301.
Platypalpus debilis Loew, Cent. iii, 37 (1861).

Although Fitch's description of *Oscinis crassifemoris* is very meagre, Mr. Coquillett who had the type for examination places it with *Platypalpus debilis* Loew.

The description of *crassifemoris* is given in full:

"The thick-legged *Oscinis* (*O. crassifemoris*) is the same size with the last (*O. coxendix*, which is 0.07 inch in length to the tip of the abdomen, and 0.10 to the end of the wings), and is black, with a white head, and the thorax with a gray reflection. The last joint of the antennæ with its bristle is black. The legs are pale yellow, the tips of the feet black. The veinlets are so near each other that they are almost united. In the female the abdomen is egg shaped and polished, its apex drawn out into a long, sharp-pointed ovipositor. The middle and anterior thighs are rather short and thick, the hind ones longer and cylindrical.

The specimens referred to this species are variable in tarsal coloring, sometimes the tarsi are yellowish, with dusky tips and sometimes annulate. The antennæ are sometimes black, in which case this species may readily be distinguished from *æqualis* and *hastatus* by the smaller tibial spur and the shape of the third antennal joint.

Massachusetts (Hough), Michigan, Idaho (Aldrich).

Platypalpus tenellus sp. nov. (Figs. 28, 38).

Length 2–2.5 mm., length of wing same.—Black, head, dorsum of thorax and pleuræ covered with gray pollen, abdomen shining. Face silvery, rather narrow; sides of front parallel. Antennæ yellow-red; third form cordiform, pointed, sometimes blackish; arista longer than antenna. Palpi and proboscis yellowish, the latter one-half of the head height. Thoracic bristles yellow,

those of scutellum longer than usual. A clear space present on pleuræ in front of the middle coxæ. Abdomen of male cylindrical, a fringe on left side of hypopygium consisting of white hairs. Legs including coxæ yellow; middle and front femora subequal; front tibiæ a little thickened; spurs of middle trochanters and of middle tibiæ black; tarsal joints sometimes faintly annulate; middle femora with black setulæ, and sparsely ciliate with yellow, middle tibiæ with black setulæ. Wings clear hyaline, veins pale yellow; third and fourth veins parallel, straight; second basal cell a little longer than first, its outer vein oblique; anal cell nearly obsolete; anal angle rounded.

One male and three females; Champaign Co., Illinois, and Brookings, South Dakota.

Platypalpus gilvipes Coquillett.

Proc. Wash. Acad. Sci., 1900, p. 422.

Black, first two joints of the antennæ, palpi, halteres, legs and coxæ yellow, last joint of the tarsi brown; third joint of the antennæ about twice as long as wide. Body polished, the front end of the pleuræ to the posterior side of the front coxæ, also the lateral margins of the metanotum, encroaching slightly on the pleuræ, opaque gray pollinose. Wings hyaline, veins brown, the first and second basals subequal. 2–3 mm.

Popof Is., Alaska (Kincaid).

TACHYDROMIA Meigen.

Rather small, slender flies, devoid of much pubescence, generally black and with the wings more or less colored. Antennæ short, apparently two-jointed, the end joint with a long, outward-pointing style. Proboscis at most as long as the head; palpi with the bristles on the underside sometimes as long as the proboscis. Eyes of both sexes subcontiguous below the antennæ. Abdomen lengthened. Legs rather long, fore coxæ more or less lengthened, fore femora with small spines below. Wings as in *Platypalpus*, except that the anal cell is completely wanting, or only the anal cross vein in part present.

Wings without cross-bands....2.
Wings with two broad dark cross-bands....14.
2. Thorax reddish .... **Bacis** Walker.
Thorax black ....3.
3. Veins bordered with brownish....4.
Veins not bordered ....5.
4. Cross-veins bordered; third antennal joint dark....**inusta** sp. nov.
Antennæ testaceous ....**vittipennis** Walker.
5. Wings unicolorous....6.
Outer part of wings more or less brown, clear at base....10.
6. Femora and antennæ wholly black ....7.
Part of the femora more or less yellow....8.

7. Tibiæ and knob of halteres yellow ..... **portæcola** Walker.
   Tibiæ and halteres black ..... **Winthemi** Zetterstedt.
8. Front femora marked with black ..... 9.
   Front femora wholly yellow ..... **postica** Walker.
9. All the tibiæ yellow ..... **fenestrata** Say.
   Middle and hind tibiæ more or less black ..... **similis** Walker.
10. Legs wholly black ..... 11.
    Legs more or less yellow ..... 12.
11. Wings with a black spot at last third of costal margin. **maculipennis** Walker.
    Wings infumated, except the whitish base ..... **clavipes** Loew.
12. Anal cross-vein wanting ..... **pusilla** Loew.
    Anal cross-vein present ..... 13.
13. Legs yellowish ..... **rostrata** Loew.
    Legs somewhat darkened ..... **rapax** Loew.
14. Marginal cell obliquely truncate; fifth vein ending in hind margin at the base of the outer dark cross-band ..... **enecator** sp. nov.
    Marginal cell narrowed to the tip; fifth vein recurved, ending in the clear space ..... **Schwarzii** Coquillett.

Tachydromia Schwarzii Coquillett (Fig. 52).

Proc. Nat. Mus., 1895, p. 440.

Shining, black. Head opaque gray pollinose, the cheeks shining. Antennæ fuscous, the third joint short, conical, the apical arista bristle-like, four times as long as the antenna. Legs dark brown, the bases of the tibiæ and of the tarsi, and sometimes of the femora, yellowish. Knob of the halteres whitish. Wings whitish, crossed by two broad brown bands, the first extending from the base of the second vein to slightly beyond the posterior cross-vein, the second extending from slightly beyond the apex of the fifth vein to a short distance beyond the tip of the second vein, leaving the base of the wing, a cross-band just beyond the middle and the tip of the wing whitish; anal cross-vein wanting, the other two of an equal length, the distance between them subequal to that between the small cross-vein and the base of the third vein, the second basal cell longer than the first by twice the length of the cross-vein; distance between the tips of the third and fourth veins equal to one-third of that between the second and third veins; marginal cell about one-half as wide as the submarginal. 2.5 mm.

California, Utah, Idaho, Texas; Guerrero, Mexico.

This is not an uncommon species, as there are numerous specimens in the collection.

The apex of the marginal cell is gradually narrowed by an even curve of the second vein; the fifth vein terminates between the middle and the outer edge of the central clear band.

The two males from Austin, Texas, differ from typical examples of *Schwarzii* in their coloration. The cross bands of the wings are dark plumbeous instead of brown, and the lighter parts of the legs are white instead of brownish. These specimens were running over

the sides of rather large stones at the bottom of a moist ravine in the vicinity of Mount Barker, a habit which has been observed among European species of this genus.

Tachydromia enecator sp. nov.

Female.—Head shining, black, occiput very sparsely pollinose, and with a few stiff black hairs, cheeks large; proboscis and palpi black, palpi as long as the proboscis and appressed to it, provided with short black hairs; antennæ short, black, the outer joint short, with the slender bristle-like arista more than four times the length of the antenna. Thorax, pleuræ, scutellum and abdomen shining black. Legs shining, black, except the knees narrowly piceous, and the metatarsi at the base piceous; middle and fore femora and tibiæ on their inner edge with evident short spinose hairs. Halteres black. Wings marked with brown as in *Schwarzii*, but differing in venation: near the apex of the marginal cell the second longitudinal vein turns sharply obliquely forward, and at the turn is provided with a short adventitious spur jutting into the submarginal cell. The third vein is slightly reflexed at the tip so that the first posterior cell is slightly broader at its apex than just before, the fifth vein has not so strong a bend near its base as is the case in *Schwarzii*, and therefore terminates in the wing margin within the dark cloud; anal cell completely wanting, the distance between the two basal cross-veins longer than the strong basal section of the third vein; the distance between the tips of the third and fourth veins equal to fully one-third of that between the second and third veins (in *Schwarzii* it is somewhat more than one-third).

Two females; St. John's Co., Quebec (G. Chagnon); Lance Creek, Wyoming (Wheeler).

Tachydromia Bacis Walker.

List of Dipterous Insects in the Collection of the British Museum, iii, p. 510.

"Body dark ferruginous; eyes dark red; lip tawny, as long as the head; feelers black; first and second joints dark tawny; third joint broad, nearly round; bristle very long, more than twice the length of all the preceding joints; abdomen piceous above; legs tawny, clothed with short black bristles; hind legs stout and long; wings colourless; wing-ribs ferruginous; veins piceous; poisers tawny. Length of the body 1½ lines; of wing 3 lines.

"Jamaica (Gosse)."

Tachydromia vittipennis Walker.

Trans. Ent. Soc. Lond., N. S., iv, p. 149.

"Black; antennæ and legs testaceous; wings gray, darker along the borders of the veins; halteres whitish. Length of the body 2 lines; of the wing 4 lines.

"U. S."

Tachydromia inusta sp. nov. (Figs. 50, 54).

Length 3–4 mm.—Black. Inner joint of antennæ reddish yellow, outer fuscous, rounded; style four times antenna. Palpi white, proboscis fuscous. Occiput cinereous-dusted, with a white beard below. Thorax finely and closely dusted, cinereous on the humeri and pleuræ, and lightly bronzed on dorsum;

scutellum with two well-separated erect bristles; tegular cilia golden; halteres light yellow. Abdomen depressed, cylindrical at tip in male, segments shining, interspaces gray dusted; hypopygium shining, terminal, but little larger than abdomen, its ventral fringe small, above with a projection bent to the right. Coxæ yellow; legs yellow, except following fuscous to black places: four anterior femora on outer side, except central yellowish portion, hind femora on tip on basal and apical thirds, four anterior tibiæ on outer side, and tarsi gradually towards tip; front femora much thickened, middle femora moderately, hind ones not; inner side of tibiæ and metatarsi of front legs, and femora and tibiæ of middle legs provided with small black setulæ; middle tibiæ of male with a slight depression before tip on underside. Wings not broad, grayish hyaline, veins strong, piceous, lightly clouded on cross-veins; first posterior cell narrowed towards tip, fourth vein ending just behind wing tip, anal cross-vein strong, a portion of sixth vein beyond anal cross-vein present.

Seventeen males, nineteen females. The sexes taken in copulation. Juliaetta, Moscow and Craig's Mt., Idaho, May. Magdalena Mts., N. Mexico, August.

Tachydromia portæcola Walker.

List Diptera, iii, p. 506.

"Body black, dull; eyes piceous; feelers and mouth black, the latter tawny towards the base; abdomen hairy at tip; legs tawny; thighs slightly piceous; wings gray; wing-ribs and veins piceous; poisers dark tawny. Length of body 1½ lines; of wing 3 lines.

"Hudson's Bay (Barnston)."

Tachydromia Winthemi Zetterstedt.

Dipt. Scand., i, p. 321.

Ins. Lap., 548.

Black. Antennæ, palpi, halteres and legs concolorous, metatarsi flavescent; wings infuscated, third and fourth veins subparallel. Thorax above black, opaque, humeri cinerascent, pleuræ shining, black. Coxæ sometimes yellow apically.

New Hampshire (Osten Sacken).

Tachydromia postica Walker (Fig. 53).

Trans. Ent. Soc. Lond., N. S., iv, p. 149.

"Black; antennæ, abdomen at the base beneath, and legs testaceous; hind femora and hind tibiæ piceous; wings cinereous, veins black, halteres whitish. Length of body 1½ lines; of wings 3 lines.

"U. S."

Four specimens from Lawrence, Kansas, agree with this description, and may probably belong to Walker's species. They are thus further characterized:

Dorsum of thorax and occiput lightly cinereous-dusted, pleuræ

and abdomen shining. Third antennal joint elliptical. Proboscis and palpi yellowish. Beard of lower occiput short, dirty white. Thorax slender, pectus silvery. Scutellum with two well-separated short bristles. Abdomen less shining than the pleuræ, shorter than the thorax, flattened, hypopygium shining, thicker than abdomen at base, much as in *inusta*, but with a dorsal fringe in addition to the larger ventral one. Coxæ yellowish, front tibiæ piceous, front femora relatively thicker than in *inusta*. The underside of the legs is devoid of true setulæ, the front femora beneath pale ciliated. Wings narrow, third vein straight, fourth slightly arching forwards, the distance between the two greater than in *inusta;* veins fuscous, not black; second basal cell longer than the first by the length of the cross-vein; basal cells narrow, sixth vein wanting, anal cross-vein present.

Mr. Coquillett determines as this species specimens received from Prof. Cockerell and taken at Mesilla, New Mexico.

Tachydromia fenestrata Say.

Say, Jour. Acad. Phila., iii, p. 95.

Wiedemann, Aussereuropæische Zweifluegelige Insecten, ii, 12, I.

Black. Antennæ yellow; palpi white, proboscis yellowish, thorax shining black, in certain directions somewhat grayish. Scutellum with two bristles. Pleuræ jet black. Abdomen piceous, darker at apex. Wings brownish. Front femora on inner side with a black line; front tibiæ and hind femora with a piceous line on each side. 4 mm.

Middle States.

Tachydromia similis Walker.

List Dipt. Ins., iii, p. 506.

"Body black, slightly shining; eyes and mouth piceous; feelers tawny, with black tips; legs tawny; tips of feet black; fore thighs striped with black; middle shanks piceous; hind thighs and tips of hind shanks black; wings brown; wing-ribs and veins piceous; poisers tawny. Length of the body 1¾ lines; of wings 2 lines.

"Hudson's Bay (Barnston)."

Tachydromia maculipennis Walker.

List, etc., iii, 507.

"Body black, shining; eyes piceous; feelers and mouth black; legs piceous; wings nearly colourless, white at base, each with a large brown spot on fore border at two-thirds the length from the base; wing-ribs and veins piceous, the latter yellow towards the base. Length of body 1¾ lines; of wings 1½ lines.

"Hudson's Bay (Barnston)."

Tachydromia clavipes Loew.

Cent., v, 73.

Black, shining; legs including coxæ largely black, apex of anterior tibiæ strongly incrassate, wings beyond the whitish base dark, provided with a posterior basal cross-vein. Antennæ dark fuscous, proboscis black, palpi white. Hypopygium with short black hairs above. 2.6 mm.

Illinois (Le Baron).

Tachydromia pusilla Loew (Fig. 51).

Cent., v, 74.

Shining, black, proboscis and palpi concolorous, no white spot on the pleuræ; coxæ yellow; anterior legs yellow, except the upper side of the femora and tibiæ and the whole of the tarsi; middle legs like front ones, except that the whole of the tibiæ is piceous, femora beneath with black setulæ; hind legs, except luteous base of the femora, piceous. Wings cinereous, outer half of costal margin infuscated, no posterior cross-vein. 2 mm.

Illinois (Le Baron), Snow, Wheeler; Massachusetts (Hough).

Tachydromia rostrata Loew.

Cent., v, 72.

Black, antennæ yellowish, palpi white, proboscis yellow, except tip. Thoracic dorsum subopaque, pleuræ shining. Coxæ yellow; legs yellow, posterior femora and all the tibiæ partly fuscous; middle tibiæ before apex slightly emarginate. This emargination is not readily seen. Wings subfuscous, whitish basally, with a posterior cross-vein. 3 mm.

New Hampshire.

Tachydromia rapax Loew (Fig. 55).

Cent., v, 71.

Black; wings subfuscous, at base whitish, with a posterior cross-vein. Coxæ yellow, with a black spot, trochanters black beneath, anterior femora with an apical dot on posterior side, united on under side to a basal dot on the anterior side; front tibiæ fuscous, apical third of posterior tibiæ dark; middle tibiæ excised before apex. 3 mm.

Illinois (Le Baron).

Specimens of this species are in the collection from Massachusetts, Indiana, Illinois, Wisconsin and Wyoming.

COLOBONEURA gen. nov.

Thick set. Head globose, longer than wide, wider than deep; eyes small, two-thirds the head height, inserted forwards and therefore the occiput large; three ocelli present, the posterior two approximated; occiput with stiff black bristles, longer on the upper vertex and between the ocelli; front narrowed mid-way between the ocelli and the antennæ; eyes notched at the antennæ; distance from the antennæ to the bottom of the labrum equal to that from the

antennæ to the ocelli; antennæ directed outwards, short, plainly three-jointed, the third joint not longer than deep, flat above, with a dorso terminal, very slightly and finely pubescent arista, but little longer than the antenna. Labrum prominent, convex, cheeks prominent, straight below; proboscis stout, shining, folding back between the front coxæ, shorter than the head height; palpi short and broad, disc-shaped, hanging down, covered with black hairs and provided with an apical bristle. Thorax stout, cut straight in front, somewhat flattened above, densely black-bristly, a few longer bristles present along the lateral edges of the dorsum, the inner pair of short acrostichals distinct; disc of scutellum, metathorax and abdomen not bristly, scutellum with four marginal bristles. Abdomen flattened, near the centre of the lateral margins of each of the dorsal segments is a small black spot, probably the place of attachment of vertical muscles;* hypopygium small, terminal, ending in a short curved ventral process. Legs stout, all the femora greatly thickened, the hind ones reaching to the end of the abdomen; legs covered with bristly hairs; femora beneath and hind femora above near the tip with macrochætæ, tibiæ on outer side with macrochætæ; tarsi simple, the joints evenly decreasing in length, but not in thickness, pulvilli large. Wings reaching to the end of the abdomen; costa evident and provided with fine dark hairs to beyond the tip of the third vein; no indication of an anal cell; anal angle very broadly rounded, rectangular.

Coloboneura inusitata sp. nov. (Figs. 47, 48, 49).

Male.—Length 3.5 mm. Black, completely covered with silvery-gray pollen, thinning out posteriorly on the abdomen. Antennæ short, black. Proboscis shining, black; palpi piceous, gray pollinose. A small, shining, yellowish, post-humeral callosity present. Hypopygium dark piceous, with a few short, black, stiff hairs on upper left side, which consists of a small convex plate, the under right side more or less flattened and contorted. Coxæ gray pollinose; femora black, becoming fuscous at the knees, tibiæ and tarsi fuscous, last joint piceous; legs shining. Halteres short, whitish. Wings opalescent, first vein, second and third on outer half of the wing, and fifth vein on inner half pale testaceous, remaining veins very faint or wanting altogether; costal bristles black, sharply contrasting with the veins.

Two males; Wood's Holl, Mass., July 13, 1899 (Wheeler); Lake Worth, Florida (Mrs. Annie T. Slosson).

* These abdominal spots remind one of the analogous markings of *Thelyphonus* and the similar ones of many Dolichopod genera, in which cases the spots are indicative of the attachment of the musculature, as the upper spots are connected with the lower by a series of vertical muscles.

HEMERODROMIINÆ.

SYNAMPHOTERA Loew.

The genus *Synamphotera*, strictly speaking, has not yet been taken in America. The species described by Dr. Loew, as referable to his genus, has been placed in the genus *Sciodromia* by Mr. Coquillett; but as it is not this form according to Dr. Loew's own statement it is here left as it was originally placed.

Synamphotera is partly characterized by having the third vein furcate, the third antennal joint small and provided with a very short style, from all of which the following species differs. As Dr. Loew has stated, *Synamphotera* is intermediate between *Hemerodromia* and *Sciodromia*, differing from the former by its slender legs and from the latter in the short incurved proboscis.

Synamphotera bicolor Loew.

Cent., iii, 34.

Black. Front sparsely cinereo-pollinose. The first two joints of the antennæ pale yellowish, the third long, acuminate, black, its terminal seta concolorous, shorter than the third joint. Proboscis somewhat incurved, yellowish; palpi rather long, yellowish. Dorsum of the thorax blackish, faintly cinerascent, with very sparse pollen; the humeri reddish; pleuræ marked with reddish, sometimes wholly reddish. Scutellar margin in some specimens reddish. Abdomen black. Hypopygium of the male concolorous, swollen, reflexed, the upper lamellæ minute, oblong-ovate, yellow. Legs and coxæ pale yellow, the very tip of the tarsi darkened. Wings hyaline, the veins luteous, the third vein simple. 3 mm.

Alaska (Sahlberg).

The form described as *Sciodromia mexicana* does not conform with the typical species of that genus, as the front femora are greatly thickened, the eyes separated, the proboscis shorter than the head, etc. In as much as a closely related form is in the collection it is advisable to construct a new genus for the reception of these American species. This genus may be called *Litanomyia*.

LITANOMYIA gen. nov.

Small, yellow, slender species: Head flattened, the lower part carried in front. Antennæ moderate. Proboscis short, pointed and subincurved. Eyes separated in both sexes, placed forward on the head. Three ocelli present. Occiput with a row of bristles. Thorax more or less cylindrical, shining, feebly pruinose, devoid of acrostichal bristles, but with three dorsal bristles present on each side; two scutellar bristles present. Abdomen slender, cylindrical,

hypopygium somewhat swollen. Legs slender, front coxæ lengthened, as long as their tibiæ, front femora greatly thickened, as long as or but little shorter than their coxæ, bristly and spinose beneath; no tibial spurs, hind tibiæ explanate at the tip. Wings long and slender, cuneiform, third vein simple, discal cell long, not acuminate apically, emitting three simple veins to the wing margin, basal cells elongate, the first basal a little longer than the second, second basal and anal cells subequal, anal cross vein perpendicular to the wing margin, anal vein evanescent, anal angle not developed.

Thorax rufous, with a median dark streak.....**mexicana** Wh. et M.
Thorax yellow, no median darker stripe.....**elongata** sp. nov.

Litanomyia mexicana Wheeler et Melander.

Sciodromyia mexicana, Biol. Cent. Am., 1901, Dipt. Suppl., p. 376.

Female.—Head black, thorax red, abdomen fuscous, legs yellow. Eyes widely separated on the front, narrowly on the face, rather small. Face silvery, front grayish. Antennæ short, first two joints yellow, third joint pointed, the terminal seta less than twice the length of the antenna. Proboscis very short, yellow. Thorax reddish, pollinose, with black macrochætæ, and with two abbreviated black vittæ in front. Halteres yellowish. Abdomen cylindrical, blunt. Legs lengthened, slender, except the thickened anterior femora; posterior tibiæ with a slight widening at extreme tip; anterior coxæ elongate, yellow, remaining coxæ reddish. Wings grayish hyaline, narrow, somewhat pointed, veins fuscous. 2 mm.

Guerrero, Mexico.

Litanomyia elongata sp. nov.

Quite similar to *L. mexicana*. It differs, however, by its lighter color and more slender form. The thorax is decidedly narrowed in front, whereas in *mexicana* it is rather square. The abdomen is fuscous in but a single specimen, all the others have the abdomen yellow. There is sometimes a fuscous spot present on the dorsum of the sixth abdominal segment. Moreover, the body is much less pruinose, the hind tibiæ lack the terminal swelling, there is no trace of the median thoracic dark stripe, the third antennal joint is rather smaller, the coxæ are concolorous with the legs, the wings are rounded at tip, and generally the costa vaguely paralled with the hind margin. The sides of the face are parallel; in *mexicana* the face is narrower centrally than above or below. The antennæ vary in color from wholly yellow to the third joint black. The thorax is sometimes even lighter medially.

Sixteen specimens; Mass., Wis., S. Dak.

The Massachusetts specimens are slightly lighter in color than the more western ones.

OREOTHALIA gen. nov.

Slender black species of the habitus of *Clinocera*. Head oval, vertical; eyes widely separated, emarginate at the antennæ, extend-

ing to the oral margin, dividing the face from the cheeks; proboscis very short, thick and flat; palpi small, broad; occiput with a row of bristles; ocelli much reduced; antennæ very short, two-jointed, the outer joint small, oval, its terminal style nearly twice the length of the antenna and slender, but thickened at the very base. Thorax rounded, devoid of acrotichals, but with two lateral rows of widely separated bristles; scutellum with two long slender bristles and four minute marginal hairs. Abdomen slender, depressed in the female, and compressed in the male; hypopygium small, terminal but reflected and of less diameter than the abdomen; female abdomen blunt and compressed at the tip. Legs very slender, nowhere thickened, the front coxæ twice as long as the others, and two-thirds as long as their femora; front femora with short spines below, on outer portion no tibial spurs; claws slender, long, empodium well developed, longer than the pulvilli. Wings slender, the third vein simple, discal cell rather long, emitting three simple veins to the margin, the second posterior cell narrow at its base, second basal and anal cells short, their outer boundary continuous, oblique, the anal vein thin and short beyond the cross-vein, anal angle poorly developed.

Oreothalia pelops sp. nov.

Length 8 mm. Wholly black, sparsely coated with fine, dull green pollen. Occipital and thoracic bristles black, abdominal and pedal hairs pale. Halteres black. Hypopygium twisted to the right, elongate, the central filament superior, directed horizontally forward, lamellæ small. Empodia and pulvilli white. Wings infumated, stigmal spot faintly darker, veins dark brown, costal setulæ very minute.

Numerous specimens of both sexes. Kendrick, Idaho (J. M. Aldrich).

HEMERODROMIA Meigen.

Rather small, slender, lengthened species, of yellow, gray or black color. Antennæ with three joints, third oval, pointed, arista short, terminal. Proboscis shorter than the head, curved slightly backwards. Eyes of both sexes not contiguous. Thorax lengthened. Abdomen longer than the thorax, hypopygium larger than the abdomen. Legs long and slender, the fore coxæ much lengthened, equalling or nearly equalling the thickened fore femora. Fore femora and tibiæ usually with minute spines beneath. Wings long and narrow, the third and fourth veins forked, discal cell with two veins, anal angle not well developed.

The European *precatoria* Fallen and Walker's *albipes* are included in the table as from North America on Walker's authority. The position of *albipes* was determined from a hint of Dr. Williston, that it is associated with *precatoria*, and therefore belongs to the group *Mantipeza*.

Anal and discal cells present.....(**Mantipeza** Rondani) 10.
Discal cell united with one of the other cells.....2.
2. Anal cell wanting.....(**Microdromia** Bigot) 6.
Anal cell present.....3.
3. Second basal emitting three veins.....(**Neoplasta** Coquillett) 4.
Second basal with two veins, one forked...(**Hemerodromia** Meigen) 5.
4. Filaments of hypopygium hidden.....**scapularis** Loew.
Filaments of hypopygium exposed.....**mexicana** sp. nov.
5. Thorax and abdomen red.....**defecta** Loew.
Thorax and abdomen black.....**collusor** sp. nov.
6. Thorax partly red.....7.
Thorax wholly black.....9.
7. Femora with a spine-tipped tubercle at base beneath.....8.
Femora with no such prominent tubercle.....**empiformis** Say.
8. Thorax vittate.....**superstitiosa** Say.
Thorax wholly red.....**rogatoris** Coquillett.
9. Front femora longer than the coxæ.....**defessa** Williston.
Front femora shorter than the coxæ.....**captus** Coquillett.
10. Wings wholly clear.....11.
Wings with at least a brownish stigma.....12.
11. Body uniformly fulvous to black.....**albipes** Walker.
Thorax reddish in greater part.....14.
12. Stigma black.....**notata** Loew.
Stigma fuscous.....13.
13. Body cinereous.....**valida** Loew.
Body light yellow, thorax brownish.....**præcatoria** Fallen.
14. Thorax darker at the margins, scutellum dark.....**obsoleta** Loew.
Thorax lighter at the margins, scutellum light.....**palloris** Coquillett.

Hemerodromia scapularis Loew (Fig. 59).

Cent., ii, 54.

Black, shining, humeri either testaceous or fuscous, rarely black, abdomen of male often nearly all black, sometimes the basal segments whitish; abdomen of the female white, black at apex, the ovipositor yellowish, its base and apex broadly black. Antennæ, proboscis, halteres and legs white. Wings hyaline, no stigma, second vein short. 3 mm.

Maryland, Maine, Pennsylvania, Tennessee, Wyoming.

The sixth vein is sometimes wanting.

This species was taken in company with *Hemerodromia collusor*. Three males, ten females.

Hemerodromia mexicana sp. nov. (Figs. 56, 60).

Male,—Length 2.5 mm. Head black, depressed. Face narrow, shining, white, lower occiput thickly covered with white pile. Antennæ and proboscis wholly yellow; last antennal joint but little longer than basal part, cordate. Thorax rather elongate, black, finely punctured; humeri testaceous, mesonotum a little depressed. Abdomen as long as the thorax, piceous, sordid above; hypopygium black, basal filament visible. Legs pale yellow; anterior femora a little thicker than the others, slightly longer than their coxæ; tarsi dusky towards tip; no bristles present. Wings hyaline, as long as the body, hind border somewhat more rounded than in *scapularis;* veins fuscous, no stigma, tip of marginal cell on a line with the end of the second basal, second basal united with the discal, sending three veins to the margin, anal vein attenuated at base.

Very similar to *scapularis* Loew, but differs in its smaller size, rather more robust form, exposed basal filaments of hypopygium, more rounded wings, stronger patch of infraocular pile and less depressed mesonotum.

One male from Orizaba, Mex., December, 1887.

Hemerodromia collusor sp. nov. (Figs. 57, 58, 64)

Length 3.5–4 mm.—Black, thorax covered with bronzed-gray pollen, abdomen finely gray pruinose. Head depressed; vertex and occiput cinereous-dusted; face moderately narrow above, wider below, candid, with slight yellowish tinge. Mouth opening large. Palpi whitish, proboscis reddish, its extreme tip black; proboscis directed backwards, a little longer than the antennæ. Antennæ reddish, short, thick, third joint ovate, pointed, its terminal arista black, thick, short, less than one-half of the length of the third joint. Ground color of the thorax and abdomen black, overlaid with bronzed dust on the notum and cinereous on the pleuræ; mesonotum depressed on the posterior half; scutellum with two closely placed, moderately long, dusky bristles. Abdomen compressed, a little longer than the thorax; hypopygium somewhat shining, erect, with dusky bristles at tip, in height equal to three abdominal segments; ovipositor somewhat recurved, black dorsally, fulvous at base and ventrally. Legs yellowish; front legs raptorial, coxæ two-thirds the length of the femora, femora thickened, with dusky bristles beneath, together with minute black setulæ, tibiæ provided with erect small hairs and an apical bristle; middle and hind legs slender, with no bristles, sometimes the apical joints of the tarsi are dusky. Halteres yellow. Wings hyaline, veins yellow, marginal cell not stunted, third and fourth veins forked, discal cell united with the second basal, sending out two veins to the margin, anal cell complete.

Seven males and fifteen females; taken at Dubois, Wyoming, and Dinwiddie Creek, Wyoming, by Dr. Wheeler, at an altitude of 7200 feet, during the early part of September, 1895.

One female collected by Prof. C. F. Baker in Colorado.

Hemerodromia defecta Loew.

Cent., ii, 55.

Whitish, apex of the hypopygium and the last two joints of the tarsi subfus-

cous. Wings hyaline, the first basal cell longer than the second, stigma obscure. Antennæ and proboscis white. 3 mm.

District of Columbia.

The described specimen is immature.

Hemerodromia superstitiosa Say.

Say, Complete Writings, i, 256.
Long's Expedit., ii, Append., 376.
Wiedemann, Ausseur. Zweifl. Ins., ii, 11, I.

Whitish, thorax and abdomen with a broad black vitta; antennæ, proboscis and vertex white, lower part and back of head piceous. The vitta is lighter in color medially. Scutellum with paler margin. On the abdomen the vitta may be constricted to a row of spots. Wings hyaline. Halteres and legs white. 4 mm.

Northwest Territory, not northwest Penn. (cf. Wiedemann).

Hemerodromia rogatoris Coquillett (Fig. 65).

Proc. Nat. Mus., 1896, p. 392.

Head black; thorax, scutellum, metanotum, pleuræ and sternum light red. Abdomen in middle of dorsum brownish red, the seventh segment wholly light yellow. Hypopygium large, projecting both above and below the abdomen, reddish brown. The large blunt tubercle near the base of the front femora bears on its summit a stout spine directed obliquely forward. 4 mm.

North Carolina (Coquillett), Wisconsin, Wyoming (Wheeler).

Of the specimens in the collection the hypopygium is black, with an erect basal filament. No thoracic macrochætæ are present. The eyes are as in *empiformis* Say, widely separated above the antennæ and very narrowly in the middle below. A mutilated specimen from Louisiana (Pilate) resembles these in the parts remaining. It has, however, strong black bristles on the underside of the front femora.

Hemerodromia empiformis Say.

Ochthera empiformis Say, Compl. Writ., ii, 85.
Hemerodromia vittata Loew, Cent., ii, 56.
" sp. *innominata* Williston, Trans. Ent. Soc. Lond., 1896, p. 440.
(?) *Tachydromia oratoria* Fallen, Empid., 13.

In regard to this species there is another entomological muddle, the following solution of which seems the most practicable. The species was described by Mr. Say as an *Ochthera*, but, as Dr. Loew pointed out, it probably is a Tachydromine. It is put in Osten Sacken's catalogue in the genus *Hemerodromia*, as a synonym of *vittata* Loew. In the Diptera of St. Vincent, Professor Williston describes a *Hemerodromia* from that island, which he suggests is the same as Say's species, and probably the same as *H. oratoria* Fallen.

As there are but a few specimens in the collection which can be referred to Say's *empiformis*, it would be premature to assert that all four species are synonymous, although the specimens agree in all the salient characters with each description.

For this reason there will be no change in the synonymy in the present paper, and the species may still be known as *empiformis* Say.

Empiformis Say.--Body whitish; head cinereous, antennæ whitish, rostrum pale; thorax dusky above; feet white, anterior thighs dilated, robust, emarginate behind the inferior middle for the tip of the tibiæ, and armed beneath with distant, equidistant, rather long setæ, tibiæ incurved at tip and mucronate, armed beneath with approximate, short setæ, intermediate and posterior feet white, tips of the tarsi blackish; abdomen deep black, immaculate. 2.5 mm.

Inhabits Illinois; New York (*vittata* Lw.), St. Vincent (sp. *innominata* Willist.), Pennsylvania.

Hemerodromia defessa Williston.

Trans. Ent. Soc. Lond., 1896, p. 439, Pl. XIV, fig. 166.

Head and thorax shining, deep piceous or black, lower part of face and occipital orbits gray pollinose. Eyes broadly contiguous on face. Antennæ light yellow, the third joint as long as the first two together. Bristles of thorax and scutellum wholly inconspicuous. Abdomen opaque black, venter yellow. Legs light yellow. Wings nearly hyaline, anterior cross-vein a little beyond the middle of the basal cells. Proboscis light yellow. 2–3 mm.

St. Vincent, West Indies.

Differs from *captus* Coquillett in the shining head and thorax.

Hemerodromia captus Coquillett.

Proc. Nat. Mus., 1895, p. 391.

Head black, white pollinose. First antennal joint one-half the length of the second, the third two and one-half times as long as the second, broadly oval, the apical third styliform. Eyes widely separated (male). Thorax opaque gray pollinose. Wings hyaline, second basal cell exceeding the first by about twice the length of the cross-vein at the apex of the second.

New York (Coquillett).

Hemerodromia albipes Walker.

List Dipt. Ins., iii, p. 505.

"Body slender, hoary, with a slight tawny tinge; eyes dark red, mouth tawny; feelers pale tawny; black towards tip; legs pale yellow; tips of feet piceous; wings colourless; wing ribs pale yellow; veins tawny, pale yellow towards base; poisers yellow. 3–4 mm.

"Hudson Bay Territory (Barnston)."

Hemerodromia notata Loew.

Cent., ii, 53.

Whitish, a median vitta of the fusco-testaceous thorax, the scutellum, metanotum and the abdomen black. Wings hyaline, discal cell oblong, quadrangular, second posterior cell longer than its petiole; stigma rounded, black. Legs yellowish, last tarsal joints black. 3 mm.

Illinois (Le Baron).

Hemerodromia valida Loew.

Cent., ii, 51.

Stout, cinereous; legs and halteres dark yellow. Discal cell of wings oblong, quadrangular, second posterior cell much shorter than its pedicel, anal cell obliquely truncate, stigma dilutely subfuscous. Dorsum with two narrow, rather obscure vittæ. Posterior tarsi apically fuscous. 4 mm.

Hudson Bay Territory.

Hemerodromia præcatoria Fallen.

Fallen, Empidæ, 10, 12, 34.

Meigen, System. Beschr., iii, 62, etc.

Pale yellow. Thoracic dorsum shining, brown, with a median rather broad, grayish vitta. Anteunæ yellow, brown apically. Vertex and face silvery. Abdomen above with a broad (brown) stripe, emarginate at incisures. Tarsi hardly darkened towards tip. Wings with brown veins. 4 mm.

Hudson's Bay (*fide* Walker).

Hemerodromia obsoleta Loew.

Cent., ii, 52.

Whitish, subfuscous above, margin of thorax and metanotum black. Wings hyaline. Discal cell oblong, quadrangular, second posterior cell a little shorter than its petiole. Stigma very faint, sublutescent. Legs whitish, last two tarsal joints black. 3.5 mm.

Illinois (Le Baron).

Hemerodromia palloris Coquillett.

Mantipeza palloris Coq., Proc. Nat. Mus., 1895, 392.

Head black, face, cheeks and lower front yellow, white pollinose. Thorax reddish yellow, marked with two slightly darker vittæ and with a whitish stripe between them; pleuræ reddish yellow; scutellum light yellow; metanotum reddish brown. Abdomen yellow, with a median dorsal indistinct brownish vitta. Legs, halteres, antennæ, proboscis and palpi yellow. Wings hyaline. 4-5 mm.

New Hampshire.

ARDOPTERA Macquart.

Small, slender, almost bristleless flies. Head depressed, oval, the lower part carried in front. Antennæ short, the third joint oval, compressed, the terminal style very long. Proboscis short and thick, directed forwards. Legs slender, long; the fore coxæ shorter

than the femora. Wings long and narrow, with numerous small white spots in the following species; the second and third veins undulating, the third vein forked, sometimes a cross-vein connects the second vein with the anterior branch of the third vein; discal cell long, emitting three veins to the wing margin; basal and anal cells small, separately closed, the anal cell a little longer than the second basal; anal angle poorly developed.

Ardoptera irrorata Fallen.

Fallen, Empid., 13, 17.
Meigen, Syst. Beschr., iii, 66, etc.

Black, legs ferruginous. Palpi small, white. Antennæ black. Front black, margined with glistening white. Thorax cylindrical, black, as long as the abdomen, with a median white irridescent vitta. Abdomen black. Halteres white. Wings brown, with scattered white dots. 2.5 mm.

Europe and North America (Loew).

RŒDERIODES Coquillett.

Face bare, not separated from the cheeks by a groove; cheeks two-thirds as broad as the eye height; proboscis nearly as long as the height of the head, rigid, the labella not developed; third joint of the antennæ oval, pointed at the apex, the apical style about as long as the remainder of the antenna; no acrostichal bristles, scutellum bearing bristly hairs in addition to the two marginal bristles; wings destitute of a brown stigmal spot, third vein forked, discal cell complete, sending two veins to the wing margin, of which the upper vein is forked, hind cross-vein very oblique, vein at apex of the anal cell nearly perpendicular, sixth vein not prolonged beyond apex of the anal cell; legs slender, destitute of bristles and of long hairs, pulvilli and empodia well developed.

Rœderiodes juncta Coquillett.

Bull. New York State Mus., 1901, No. 47, p. 586.

Black, the coxæ and femora yellow, tibiæ and tarsi brown; head whitish pruinose, the front and upper part of the occiput grayish black; thorax opaque; mesonotum grayish black pruinose, an elongated spot in front of the scutellum, and the pleura whitish pruinose; five pairs of dorso-central bristles; scutellum, except its extreme base, gray pruinose, abdomen opaque, almost velvety; wings grayish hyaline, unmarked. 2.5 mm.

New York (Needham).

The very poorly described *Hemerodromia albipes* Walker may possibly be this species.

CLINOCERA Meigen.

Small, slender, almost glabrous species of gray, olivaceous, or piceous color. Antennæ three-jointed, short, the third joint oval, with a short, outward-pointing bristle. Proboscis thick, short. Eyes of both sexes separated, not or but little emarginate at the antennæ. Thorax elongate, abdomen long and narrow; hypopygium small. Legs long and slender; fore coxæ shorter than the femora. Venation not uniform, the third vein always forked, sometimes a cross-vein present in the first submarginal cell; discal cell sometimes pointed at the tip, sending three veins to the margin, if two, then the first is forked near its base; anal angle not well developed.

Mik's division of *Clinocera** into ten genera is not followed in this paper, as the characters chosen by him from the European species do not seem to be sufficiently correlated in the American forms to justify the adoption of certain of his genera.

Legs including the knees black ....2.
At least the knees reddish .....7.
2. Discal cell very oblique apically .....3.
Discal cell moderately broad toward the tip ....5.
3. Second and third veins united by a cross-vein, wings spotted.
conjuncta Loew.
Second and third veins free, wings not spotted, anal vein wanting .....4.
4. Second submarginal cell short.....**simplex** Loew.
Second submarginal cell long.....**lepida** sp. nov.
5. Stigma obsolete, discal cell very long and narrow..**dolicheretma** sp. nov.
Stigma distinct, wings with well-developed spots, discal cell short.....6.
6. Knob of the halteres reddish, second and third veins united by a cross-vein.
taos sp. nov.
Halteres black, only two submarginal cells present.....**lecta** sp. nov.
7. Wings uniformly subfuscous, with no darker spots .....8.
Wings cinereous or hyaline.....9.
8. Thoracic dorsum evenly opaque .....**fuscipennis** Loew.
Thorax with three intervittal spaces shining, veins undulating.
lineata Loew.
9. Legs black, only the knees reddish, lower part of the face silvery pollinose.
binotata Loew.
Legs almost altogether testaceous, front black ....10.
10. Wings hyaline ....**maculipes** Bigot.
Wings spotted with fuscous.....**maculata** Loew.

Clinocera simplex Loew.

Cent., ii, 49.
(?) *Heliodromia longipes* Walker, List., etc., iii, p. 504.
Olivaceo-cinereous, opaque. Head black, white pollinose, the frontal vitta and

* Verhandl. d. k. k. zool. bot. Ges., Band xxxi, 1881, p. 320.

a large occipital spot greenish. Antennæ black. Cheeks broad. Palpi black. Thorax olivaceous, slightly grayish, scutellum, metanotum and pleuræ white-pollinose. Abdomen grayish, with an olivaceous tinge. venter white-pollinose. Hypopygium of the male reflexed, of the same color as the abdomen. Legs slender, black, with short black pile, no apical hairs on the femora, empodium equal to the pulvilli. Halteres piceous, the base paler. Wings cinereous, the stigma obsolete, long, very pale, subfuscous, the first two veins fuscous, the others black, costal setulæ very small, the second longitudinal vein straight, the second submarginal cell short, apex of the discal cell sharp, the second posterior cell cuneiform, no sixth vein. Length 4.3 mm.

Hudson Bay Territory.

It is possible that Walker's *Heliodromia* is Loew's species. The short description of *longipes* agrees very well with that of *simplex*, but in the absence of specimens it would be premature to change the synonymy.

Clinocera lepida sp. nov.

Length 3.5 mm.—Black, covered with dull dark olivaceous pollen on the upper surface and on the legs, and with whitish but not silvery pollen elsewhere, *i. e.*, on the lower part of the face, the cheeks, the pleuræ and the venter. Eyes small, unemarginate, not dividing the large cheeks from the face. Proboscis short, fleshy, black, palpi black. Antennæ distinctly three-jointed, black, the joints subequal, the third joint ovate, arista not longer than the antenna. Acrostichals not developed. Scutellum with only two bristles. Coxæ with a few pale hairs apically. Legs slender, black, front femora a little thickened and with a row of minute fine hairs beneath vanishing apically, sides of the femora devoid of long apical bristles, empodium prominent, golden yellow, larger than the claws or the pulvilli. Halteres wholly black. Wings hyaline, lightly cinereous, unspotted, rather broad, veins black, the third vein thickest, second submarginal cell long; the base of the second submarginal cell, the base of the second posterior, and the apex of the discal cell have almost the same angulation; second basal and anal cells of nearly equal extent apically, anal vein wanting; costal setulæ very minute.

One female; Juliaetta, Idaho (Prof. J. M. Aldrich).

This species agrees with *Chamædipsia* Mik, except for the lack of the characteristic thoracic bristles. From *Clinocera* (sen. strict.) it differs in that the larger cheeks are not constricted off from the clypeus. Both of these characters received much stress from Mr. Mik.

Clinocera dolicheretma sp. nov.

Length 4–5 mm.—Black, coated with olivaceous above and cinereous beneath. Face wholly white dusted. Antennæ very short, black, the joints minute, the arista four times the length of the third joint. Clypeus reaching below the eye, but distinctly separated from the cheeks. Palpi and proboscis black. Occipital bristles dense, scattered over the vertex, the lower cilia prominent. No acrostichal nor intermediate dorso-central bristles; scutellum with two minute bris-

tles besides the two moderately large marginal ones. Mesonotum with traces of two black vittæ; pleuræ, pectus and coxæ coated with white dust, coxal and metapleural bunch of hairs yellow, prominent. Abdomen cinereous, olivaceous brown above; hypopygium small, slender, completely reflexed, the terminal heel robust. Legs slender, black, the femora black-spinose beneath apically, of the male the front femora have the lower surface provided with pale cilia near the base, no long bristles present; the male front tibiæ are provided with a double row of hairs on the under surface, the front row short, spine-like, the hind row consisting of fine and long hairs; pulvilli minute, empodium as long as the claws. Wings long, slender, hyaline, with a faint infumation, the stigma faint, narrow; veins black, the third vein strongest, the second submarginal cell long, narrow; discal cell very long, not pointed, the first section of its anterior border nearly two-thirds the length of the second section and twice as long as the vein between the second basal and discal cells, the posterior border three times the length of the outward continuation of that vein; anal and second basal cells separately closed, of equal extent, anal vein evanescent.

Numerous specimens. Juliaetta, Idaho (Prof. J. A. Aldrich).

This species apparently belongs to the division *Rœderia* Mik.

Clinocera conjuncta Loew.

Wien. Ent. Monatschr., iv, 80.

Olivaceous, thorax with two black vittæ, pleuræ and coxæ white-pollinose, legs wholly black. Wings fusco-maculate; an obsolete spot between the third and fourth veins behind the cross-vein, a second ascending from the third vein to the fusco-cinereous stigma, a third uniting the basal part of the anterior branch of the third vein with the cross-vein which connects it with the second, a fourth including the veins which close the small and apically very oblique discal cell, a fifth present on the last segment of the fourth vein. Halteres dull yellowish. 4.5 mm.

Washington, D. C. (Osten Sacken).

Clinocera taos sp. nov.

Length 3 mm.—Black, occiput and sides of the mesonotum closely dull dark olivaceous pollinose. Face bare, narrow below the antennæ, the lower part white-pollinose, constricted from the small cheeks. Antennæ short, the basal joints short, the arista a little longer than the antenna. Proboscis and the palpi black. Occiput and pleuræ olivaceous, becoming cinereous on the coxæ, middle of the mesonotum, scutellum, metanotum and abdomen. No acrostichals nor intermediate bristles among the dorso-centrals; scutellum with only two bristles. Legs slender, coxæ with short sparse golden-yellow hairs bunched together apically; no long lateral apical femoral bristles; empodium, pulvilli and claws subequal, minute. Knob of the halteres reddish. Wings moderate, infumated, with three more or less interrupted darker cross-bands, the first including the anterior cross-vein, another somewhat proximal to the posterior cross-vein, the third passing through the abrupt base of the second submarginal cell; veins with a feeble trace of undulation, the anterior branch of the third vein connected with the second vein; discal cell moderately broad, the first section of its anterior border one-half the length of the second section, the hind border one-third longer

than the outward continuation of that vein; anal and second basal cells outwardly nearly flat, closed together, oblique, anal vein indistinct; no costal setulæ.

One female; Franconia, New Hampshire. This species belongs to Mik's resurrected genus *Heliodromia* Haliday.

Clinocera lecta sp. nov.

Length 3 mm.—Black, coated above with dull dark brown pollen becoming cinereous on the face, lower occiput, pectus, pleuræ, coxæ, lateral spot of the mesonotum, metanotum, abdomen, knob of the halteres, and the under side of the front femora. Antennæ short, black, the first two joints minute, arista subequal to the antenna. Eyes large, separating the naked face from the cheeks. Proboscis and palpi black. Occipital bristles short, arranged in a semi-circular marginal row. Mesonotum with two opaque black vittæ, nowhere shining, no achrostichals, the dorsi-centrals without intermediate bristles; scutellum with only two long hairs. Hypopygium recurved, the lower portion produced as a strong heel. Legs slender, black, front femora of the male with minute bristles beneath, and with a small apical fringe of minute hairs on the front side; empodium longer than the claws or pulvilli. Wings hyaline, with three faint spots, the first round, centering about the anterior cross-vein, the second elliptical, passing through the posterior cross-vein and extending from the marginal to the fourth posterior cells, the third spot circular, centering about the base of the second submarginal cell; stigma well-developed, elongate, elliptical; the centers of the cells purer hyaline than the margins; base of the second submarginal cell abrupt, and with a short adventitious spur extending into the first submarginal in the males; second posterior cell broad at the base; discal cell moderately broad and rather long, the first section of its anterior border one-fourth the length of the second section and equal to the externo-anterior edge of the second basal cell; anal and second basal cells closed together, their outward boundary oblique, anal vein imperfect; costal setulæ inconspicuous, very minute. Halteres black.

Two males and one female; Kendrick and Lewiston, Idaho (Prof. J. M. Aldrich).

This species belongs to *Phœobalia* Mik.

Clinocera binotata Loew.

Zeitschr. f. ges. Naturw., 1876, p. 325.

Olivaceous, front and upper half of face black, lower half of face while-pollinose, dorsum of thorax with two narrow black vittæ, abbreviated behind; legs black, apex of all the femora rufescent, anterior femora thicker towards the base, and bearing a few longer hairs below; wings subcinerous, the anterior branch of the third longitudinal vein lined with black near its base, also the adventitious vein by which it is connected with the second longitudinal, and the posterior cross-vein bordered with black. 3 mm.

New York (Osten Sacken).

Two females from Montreal, Quebec, belong to this species. The two scutellar bristles are very long. The face is constricted from

the cheeks, but the clypeus extends below the eyes. The rufescence at the knees is not conspicuously well marked. Halteres black. Discal cell blunt. This is a *Clinocera* in Mik's sense.

Clinocera maculata Loew.

Wien. Ent. Monatschr. iv, 79.

Olivaceous, thorax obsoletely bilineate, pleuræ and coxæ white-pruinose, venter glaucous; femora and tibiæ testaceous, tarsi black. The anterior branch of the third vein is marked with a fuscous spot at its base, ascending to the apex of the second vein, and with another smaller spot at its apex. Halteres black. 3 mm.

Washington, D. C. (Osten Sacken).

Clinocera lineata Loew (Figs. 61, 62).

Cent., ii, 50.

Black, dusted with olivaceous green above, subopaque. Antennæ black, very short; cheeks moderate, together with the face white-pollinose; palpi black. Two shining vittæ on the thoracic dorsum, separated by a black line, and margined outwardly by a black vitta. Scutellum of the same color as the thorax; the lower half of the pleuræ covered with white pollen. Abdomen somewhat shining. Legs slender, almost bare, the base of the coxæ often, the knees, the very apex of the tibiæ and the last joint of the tarsi always fuscous; no setulæ present at the apex of the femora; empodium minute, equal to the pulvilli; claws minute. Halteres dark fuscous. Wings lightly infumated, the veins dark brown, no costal setulæ; the second longitudinal vein sends a cross-vein to the costa of the wing before its end; the third longitudinal vein undulating, the anterior branch reaching forward more than in the other species; a clear spot present in the very apex of the discal cell. 2.3 mm.

Pennsylvania (Osten Sacken). Three specimens from Seattle, Washington, notwithstanding their distant locality, I take to belong to this species.

The postocular bristles are regularly arranged in an interrupted semicircular row of about fifteen in number, and are not supplanted by pale cilia beneath. The two outer vittæ of the thorax bear the dorsal bristles. The cross-vein in the marginal cell is wanting in these western specimens, but its place is indicated by a sharp upward bend of the second vein; but a trace of the anal vein is left.

There is much greater resemblance between *Clinocera appendiculata* Zetterstedt (European) and *Clinocera* (*Rœderia*) *dolicheretma* than between *Clinocera binotata* Loew and *lineata* Loew, yet the former two are generally different, while the latter fall together according to Mr. Mik's arrangement.

Clinocera lineata is intermediate between the other species and

the genus *Ardoptera*, as is seen from its venation, but is more closely related with the Clinoceras on account of the conformation of the mouth and the shape of the head.

Clinocera fuscipennis Loew.

Zeitschr. f. ges. Naturw., 1876, p. 324.

Piceous, front and face concolorous, dorsum of thorax not vittate, legs fuscous, wings wholly, uniformly subfuscous, stigma scarcely darker, costa free from setulæ, second submarginal cell narrower than the end of the first, last section of the fourth vein exceeding by a little the length of the discal cell. 2.5 mm.

New Hampshire (Osten Sacken).

Clinocera maculipes Bigot.

Bull. de la Société Zool. de France, 1887.

Black; antennæ, halteres and legs pale yellowish; front black; femora spotted with pale fuscous on the underside near the tip; tarsi narrow, black apically; wings hyaline. 2 mm.

California.

HYBOTINÆ.

HYBOS Fabricius.

Small, slender, almost glabrous species, of generally shining black color. Antennæ short, apparently two-jointed, the terminal bristle long. Eyes bare, contiguous above in both sexes. Thorax prominent, hunched; abdomen long and slender, curved downward. Hind femora long and thick, bristly beneath. Wings unspotted, variable in color; second vein straight, third vein simple; discal cell longer than the second basal, rounded at tip; anal angle large, rectangular.

In as much as Walker, Bellardi and Loew have each described a different species of *Hybos* as *dimidiatus*, it may be well to revise the names here to avoid further confusion. Therefore Walker's species* from Brazil having priority may remain. Loew's *dimidiatus*† originally described from Cuba may be called *electus;* while the Mexican species of Bellardi ‡ may hereafter be known as *sequens.*

Costa rounded, bearing strong spines ..... **spinicosta** Wh. et Mel.
Costa straight, without spines ..... 2.
2. Posterior femora strongly toothed beneath, much swollen; wings wholly fuliginous (Brazil).... **Lactistomyia insolita** gen. et sp. nov.
Posterior femora more slender; wings at least in part hyaline ..... 3.

* Walker, Insecta Saundersiana, p. 205, 1856.

† Loew, Wien. Ent. Monatschr., v, 36, 1861.

‡ Saggio Dipt. Mes., ii, 97, 1861.

3. Legs wholly yellow ..... **sequens** nom. nov.
   Legs in part dark brown to black ..... 4.
4. Halteres yellow ..... 5.
   Halteres infuscated ..... 7.
5. Wings hyaline ..... 6.
   Wings gray, though hyaline at base ..... **reversus** Walker.
6. Legs wholly black ..... **typicus** Wh. et Mel.
   Tibiæ and tarsi more or less yellow ..... **slossonæ** Coquillett.
7. Stigmal spot noticeable ..... 8.
   Stigmal spot obsolete ..... **triplex** Walker, varieties.
8. Wings completely hyaline ..... 9.
   Wings more or less infumated basally ..... 10.
9. Tibiæ black ..... **mellipes** Wh. et Mel.
   Tibiæ fulvous; size smaller ..... **electus** var.
10. Thorax and abdomen with bluish reflections ..... **electus** nom. nov.
    Thorax and abdomen black ..... **triples** Walker, varieties.

Hybos typicus Wheeler et Melander.

Biol. Cent.-Am. Dipt. Suppl., 1901.

Black cinereous, slender. Antennæ black, short; third joint oval, not longer than the first. Eyes contiguous below antennæ. Proboscis black. Thorax prominent, black, shining through the coating of brown dust; pleuræ cinereous-black. Halteres yellow. Abdomen slender, piceous, slightly pubescent, especially towards apex. Genital apparatus of male small, not giving the abdomen a club-shape, with two projecting filaments. Legs slender, piceous, shining, with scattered pubescence, knees lighter, front tarsi long, metatarsus equal to the tibia, middle tibiæ with two long slender bristles on the external side at basal fourth and half, and three on inner side at half, three-fourths and tip; hind femora not much thickened, not evidently serrate beneath, besides the pubescence a series of about six hairs beneath; hind tarsi not toothed beneath. Wings hyaline, subquadrate, obtusely rounded at apex, anal angle not strong, veins yellowish; third vein terminates beyond the middle, parallel with the fourth; stigmal spot not well developed, not filling out the apex of the marginal cell; discal cell broad; anal vein not evident. The fine hairs around the margin of the wing are not so closely placed as usual. 4.5 mm.

The males have the front legs sparsely ciliate with long hairs; the tibiæ on the posterior side and the metatarsi on both sides.

Guerrero, Mexico (H. H. Smith).

Hybos spinicosta Wheeler et Melander (Fig. 77).

Biol. Cent.-Am., 1901, Dipt. Suppl., p. 374.

Differing from *typicus* as follows:—Face narrower, dusted with silvery-white instead of gray. Legs wholly pitchy-black; the tibial and tarsal bristles are shorter and more numerous. The posterior legs and the abdomen are covered with much shorter hairs; the abdomen not shining, dusted. The hypopygium is terminal and more enlarged. The wings are somewhat infuscated, broader and with peculiar venation; costa bent at tip of first vein, so that the anterior edge of the wing is bowed outwardly, beset with spiny hooks from the junction of the auxiliary vein, these hooks gradually becoming straight at about the middle of

the wing and passing insensibly into the usual fringe of hairs; stigmal spot very broad; second vein strongly curved in a double curve to accomodate itself to the deep stigma, ending much nearer to the tip of the first vein than usual; third vein straight, subparallel with the costa in the outer part of its length; discal cell narrow, the cross-vein at its apex perpendicular to the penultimate section of the fifth vein. The halteres seem to have been dark. 4.5 mm.

Guerrero, Mexico (H. H. Smith).

Hybos mellipes Wheeler et Melander (Fig. 78).

Biol. Cent.-Am., 1901, Dipt. Suppl.

Black, shining, moderately strongly yellow-pilose. The two parts of the antennæ are subequal in length, arista shorter than the eye-height. Eyes contiguous below the antennæ, leaving a small subantennal triangular space shining black. Mesonotum shining black, moderately strongly pilose. Pleuræ black, shining, not cinerescent. Pedicel of halteres black, knobs defective. Abdomen shining black, robust, not unusually hairy. Legs except tarsi shining black, strongly hairy; posterior femora incrassate, not strongly spinulose beneath; first two joints of tarsi yellow, remainder blackened. The hairs of the legs are longer laterally, so as to give the legs, especially the tarsi, a ciliated appearance when viewed from the front. Wings narrow, wholly hyaline, except for the fuscous stigma which completely fills the outer third of the marginal cell; veins strong, discal cell narrow. 4 mm.

Guerrero, Mexico (H. H. Smith).

Except for the usual postoculars the pile is yellowish.

Hybos electus nom. nov.

Hybos dimidiatus Loew (nec Bellardi nec Walker), Wien. Ent. Monatschr., v, 36.

Wholly black, very shining, thorax with a greenish, abdomen with a bluish tinge. Pile of the whole body pale, of the abdomen whitish. Legs black, the apex of the femora, the front and middle tibiæ, and the first two joints of the tarsi yellow, the remaining joints blackish. Some longer setæ present near the apices of the anterior and middle tibiæ, and on the anterior metatarsi. Halteres black. Basal half of the wings blackish, apical cinereo-hyaline, stigma very distinct, oblong, black. 3 mm.

Cuba.

Three specimens from St. Vincent Island show variation in the fuscous legs, hyaline wings and slightly smaller size, though they retain the bluish body color of Loew's typical *dimidiatus*.

From this variety two specimens from St. Vincent, four from Tifton, Georgia, and two from New Bedford, Massachusetts, vary in the blackish body color, but are similar to it in other respects.

The extension of this species to the United States is interesting.

Hybos slossonæ Coquillett.

Proc. Nat. Mus., 1895, p. 437.

Head, including the antennæ, proboscis and palpi, black; face broad, whitish

pollinose; proboscis slender, rigid, slightly longer than the height of the head only slightly longer than the palpi. Thorax black, shining, lightly pollinose, the pile rather long, yellowish white; pleuræ black, subshining, lightly pollinose, no long pile in front of halteres; scutellum black, subshining, bearing two long yellowish apical bristles and several shorter ones. Abdomen black, shining, its long pile yellowish white. Coxæ and femora black, apices of front and middle femora yellow; front and middle tibiæ yellow, the hind ones black; tarsi yellow, underside of the first two joints of the hind tarsi beset with small black points, sides of hind metatarsi destitute of long black spines. Knob of halteres yellow. Wings hyaline, the stigma grayish brown. 3–4 mm.

New Hampshire, Massachusetts, Wisconsin; numerous specimens.

Hybos reversus Walker.

List Dipt. Ins., iii, p. 487.

Body black, shining; eyes dark bronze; feelers black; abdomen clothed with long hoary hairs; legs yellow; hips, thighs and hind shanks black; tips of four front thighs yellow; four front shanks tawny towards the base; hind feet and tips of four front feet tawny; wings pale brown, darker along the borders of the veins, colorless at the base; wing-ribs and poisers yellow; veins piceous, yellow towards the base. 4 mm.

Trenton Falls (Walker); Jamesburg, N. J. (C. W. Johnson).

Hybos triplex Walker (Figs. 79, 80, 81).

Hybos purpureus Walker, List Dipt. Ins., iii, p. 486.
Hybos duplex Walker, List., etc., p. 486.
Hybos triplex Walker, List, etc., p. 486.
Hybos subjectus Walker, List, etc., p. 487.
Euhybos Coquillett, Proc. Nat. Mus., 1895, p. 437.

As this genus contains some of the most variable of flies, it is not strange that with the limited material at his disposal Mr. Walker should erect four species on what is now given as a single form. The unusually rich collection of this species shows variations in color to every degree; hence, even the Mexican varieties which are to some extent distinct had better be dropped as varietal names. In establishing these forms it was not the intention to erect mere catalogue names, but to give convenience in handling the collections.

The name *triplex* is chosen, as it has been used more than the others for this species.

The genus *Euhybos* Coquillett, established on Walker's species, has been rejected because its characters are shared in varying part by the Mexican species.

Head: occiput finely dusted, finely pubescent. Eyes brownish, contiguous above and below the antennæ. Antennæ black, third joint oval to subulate, blunt at the tip or gradually passing into the arista. Mouth parts inconspicuous.

Thorax black, shining, with long or short, rather dense to moderate, white to black, or mixed white and black hair. Pleuræ glabrous. Scutellum with two bristles.

Abdomen black, shining, except the hypopygium and the last two segments of the female, with sparse or bushy whitish hairs, denser on the sides of the segments basally. Hypopygium with denser and shorter hairs, small; the valves vary in length, the ventral process may be minute or in the lengthened hypopygium elongate.

Legs wholly black, except the pulvilli, or more or less yellowish, with bristle-like and ordinary, whitish to dusky hairs. Hind femora piceous to shining black, variable in length and thickness, black-spinose below. Front and middle legs slender. Hind tibiæ bowed, without bristles, piceous to black. Front and middle tibiæ piceous to black, with bristles. Knees sometimes yellowish. Metatarsi often yellow. Tarsi variable in amount of yellow color, always dark at the tip, with several long, slender bristles, except on the hind pair.

Wings almost clear hyaline to brown, except the apical third or less. Stigmal spot brown or absent. Halteres fuscous. 2.5–5 mm.

This description of an insect which may well share with the beetle *Nodonta* (*Colaspis*) *tristis*, the distinction of being the most protean of insects, is drawn from an examination of over a hundred specimens. These flies were collected throughout the eastern half of North America. The localities represented are Massachusetts, Pennsylvania, Maryland, North Carolina, Georgia, Alabama, Ohio, Ontario, Michigan, Indiana, Illinois, Wisconsin, Colorado, Texas, Vera Cruz, Tabasco and Yucatan.

Hybos sequens nom. nov.

Hybos dimidiata Bellardi, Mem. della Reale Acad. delle Scienze di Torino, Ser. ii, vol. xxi, p. 197.

Female.—Brownish black. Head moderate; antennæ black; proboscis yellow; occiput black. Thorax strongly convex, brownish black, with dense and short fuscous tomentum; humeri pale; pleuræ and pectus pale fuscous; scutellum brownish black, concolorous with the thorax; halteres pale at the base, subfuscous apically. Abdomen brownish black, side margins pale; venter black, pale at the sides; ovipositor long, acute, black. Legs honey-yellow, with black spines; posterior femora much thickened, long. Wings strongly fuscous at base, apically subhyaline; first posterior cell much narrowed at the margin of the wing; stigma elongate, fuscous. 5 mm.

Mexico (Salle).

Among the Empidæ to be worked over for the Biologia Centrali Americana of Messrs. Godman and Salvin were two species, both undescribed, taken in Chapada, Brazil. One of these, the subject of this note, is a peculiar Hybotine, which can not be classed with any of the known genera. This fly, though clearly belonging to

the subfamily Hybotinæ, presents a habitus much different from that of any of the other members of the group. Both in color and structure it departs from its nearest relative *Hybos* Fabricius, from which it may be distinguished by the uniformly brown wings, the narrowed first posterior cell, the greatly thickened legs, the smaller number of bristles, the stouter abdomen, the large hypopygium, etc.

From *Scelobates* Philippi* this form may be separated by the two-jointed antennæ, longer anal cell, stouter abdomen, shorter and stronger legs, etc.

From *Harpamerus* Bigot† (Ceylon) a close relative apparently; it is generically distinct, in that the spines of the underside of the hind femora arise from the apices of strong tubercles instead of being merely incrassate towards the base. The anal cell seems to be longer, and the whole wing different.

LACTISTOMYIA gen. nov.

Robust; thorax and abdomen densely covered with fine reddish brown tomentum. Antennæ very short, two-jointed, the outer joint elongate-oval, slightly longer than the inner joint, with a slender terminal bristle over four times the length of the antenna. Proboscis slender, projecting forwards, two thirds the height of the head. Palpi slender, parallel with and shorter than the proboscis. Eyes bare, rufous, contiguous from the antennæ to the three ocelli, the upper half consisting of larger ommatidia than the lower. Postocular bristles minute. Thorax globose, very prominent, with no bristles, but with scattered, fine, reddish pubescence, longer at the sides, and almost bristle-like at the margin of the scutellum. Abdomen robust, cylindrical, deflexed at the tip, twice the length of the thorax, with fine pale hairs along the sides of the segments, longer than those of the thorax. Hypopygium large, deformed, flexed to the right, consisting of a large, very convex, dorsal piece, produced at the right distal corner, and with a marginal fringe of small bristles, and a lengthened, transversely convex, ventral valve, irregularly produced and twisted to the left of the upper projection; between the two arises the thin compressed, semi-translucent, hastate penis. Legs short, robust, front and middle legs simple, though stout, hind legs remarkably thickened, strongly tuberculate

* Verh. d. k. k. zool. bot. Ges., Band xv (1865), p. 751.

† Revue et Mag. de Zool., No. 7 (1859).

and spiny below, and bristly above; hind tibiæ glabrous, bent at proximal fourth and from thence uniformly curved, sharp on inner edge, rounded on the outer, the side faces flat. Middle tibiæ on the outer edge with three bristles; remaining hairs of the legs finer, denser on the front and middle legs, though nowhere long. Wings broad, rather pointed at the tip, anal angle prominent, rounded, almost rectangular; veins strong; first posterior cell much narrowed in the margin; discal cell long and narrow; outer section of the fifth vein equal to the posterior cross-vein; outer section of the sixth vein shorter than the anal cross-vein.

Lactistomyia insolita sp. nov. (Fig. 82).

Male.—Length 5.5 mm., length of wing 4.5 mm. Robust, piceous, with a greenish tinge. Antennæ piceous, exceedingly short, the arista a little shorter than the eye height. Palpi and proboscis fuscous; proboscis one-fourth shorter than the head. Eyes narrowly separated on the face. Thorax with golden pubescence and brownish dust. Tegulæ and halteres infuscated, the former with short yellow cilia. Abdomen dark olive green, pilose along the sides, twice the length of the thorax; hypopygium large, reflexed, concolorous, except the lighter metallic, fuscous distal portion, its sutures fringed with hair, the left side with a larger, inverted, the right side with a smaller, bowl-shaped piece. Legs short, stout, fuscous, shining, especially the hind legs, metallic by certain reflections; coxæ concolorous with the legs; anterior and middle femora, tibiæ and tarsi all of about the same length; posterior coxæ globose, swollen on the inner side; posterior femora not surpassing the abdomen in length, enormously thickened, sparsely hairy, on inner side bounding a narrow, smooth, shining space, with two rows of tubercles, about eleven in the anterior row and seven in the posterior, each tubercle provided with a stout spine; hind tibiæ stout, one-third less than the length of the femora, strongly incurved, without spines, but with an external row of short hairs; hind tarsi short, one-half the length of the others, the first joint one-third longer than the remainder of the tarsus. Wings strongly infuscated, of the same general color of the rest of the insect, no darker stigma; rather pointed; veins strong, third and fourth longitudinal veins convergent, ending symmetrically at the tip of the wing; discal cell narrow; anal angle fully developed, anal vein strongest at the tip, though poorly marked.

A single male specimen. Chapada, Brazil. A very curious insect.

SYNECHES Walker.*

Small, generally brownish species. Antennæ shorter than the head, apparently two-jointed, terminal joint rounded with a long end-bristle. Proboscis short, palpi rather long. Eyes bare, con-

* Almost the only note on the manner of feeding of American Empididæ is to be found in the Proceedings of the Washington Entomological Society, 1891, p. 146. There Mr. Schwarz describes the feeding habits of a species of *Syneches:*

tiguous in both sexes. Thorax large, hunchbacked, abdomen long, small at tip. Hind femora long, incrassate, with setulæ beneath. Wings generally spotted, second vein bowed towards the costa, third vein simple, discal cell present, with two veins at its tip; anal cell as long as the second basal, nearly truncate at its tip, anal angle rectangular.

Wings unspotted, or marked with only one spot ..... 2.
Wings with a black spot beyond the apex of the first vein and another at the apex of the second vein; marginal cell at tip of first vein twice as wide as the submarginal cell at that point ..... **simplex** Walker.

2. Legs partly or wholly yellowish ..... 3.
Legs wholly black, thorax marked with a white pollinose humeral spot, and with a similar one in front of the scutellum; stigma brownish. **albonotatus** Loew.

3. Wings marked with a brown stigmal spot ..... 4.
Wings with a pale gray stigmal spot, femora wholly yellow. **hyalinus** Coquillett.
Wings unspotted, knob of halteres and the entire body black. **pusillus** Loew.

4. Marginal cell at apex of first vein twice as wide as the submarginal cell at the same point; knob of halteres whitish ..... 5.
Marginal cell not widened ..... 6.

5. Thorax wholly yellowish ..... **rufus** Loew.
Thorax marked with three black vittæ, or wholly blackish. **thoracicus** Say.

6. Knob of halteres black ..... **debilis** Coquillett.
Knob of halteres brown ..... **quadrangularis** Wheeler et Melander.

Syneches albonotatus Loew.

Cent., ii, 18.

Black, opaque, thorax marked with white pollinose shoulder-spots and one before the scutellum. Abdomen with fuscous pollen. Legs black, shining, tarsi piceous, black towards apex. Wings dark cinereous, veins black, stigma subobsolete, pale fuscous. 3.5 mm.

District of Columbia (Osten Sacken).

Syneches hyalinus Coquillett.

Proc. Nat. Mus., 1895, p. 437.

Opaque, black, base of the abdomen yellowish; antennæ and knob of halteres

"During daytime these flies rest on the under side of leaves, etc., in the shadiest parts of the woods. Toward evening they fly about in the more open places and capture minute Diptera. Holding their prey between the legs, and their body being in a vertical position, they slowly fly toward the nearest bush, and, without alighting, most dexterously manage to take hold of the edge of a leaf with the claws of a front leg. Thus vertically suspended by a single leg, the fly uses its five free legs for manipulating the gnat. Within ten seconds it has sucked out its prey, then drops the same and flies away."

yellowish brown; proboscis and legs yellow; coxæ, trochanters and tips of tarsi black; wings hyaline; stigma pale grayish; marginal cell at tip of first vein nearly twice as wide as the submarginal cell at that point. 5 mm.

Maryland (Coquillett).

Syneches pusillus Loew.

Cent., i, 25.

Small, opaque, dark fuscous. Proboscis yellow. Antennæ dark fuscous. Abdomen black, opaque, posterior margins of the segments narrowly cinereous pollinose. Legs pale yellow, varied with fuscous, in the lighter specimens the basal half of all the femora, the apex of the posterior femora, a subapical ring on the posterior tibiæ, a middle ring and the last joint of the posterior tarsi fuscous in color; in the darker specimens these markings are more diffused and nearly black. Halteres dark fuscous, the pedicel lighter. Wings cinerascent immaculate.

Illinois; New York: St. Vincent, W. I.; Wisconsin; Kansas; New Mexico.

Syneches debilis Coquillett.

Proc. Nat. Mus., 1895, p. 436.

Antennæ black, proboscis and palpi yellow. Thorax yellow, marked with three vittæ and a lateral spot of yellowish brown. Abdomen and knob of halteres black. Legs yellow, the last tarsal joints, apices of hind femora, middle of hind tibiæ and of their first tarsal joints black. Wings grayish hyaline, stigma pale smoky brown, marginal cell at tip of first vein not wider than the submarginal cell at the same point. 3.5 mm.

District of Columbia; Maryland: Georgia.

Syneches quadrangularis Wheeler et Melander (Fig. 85).

Biol. Cent. Am., 1901, Dipt. Suppl., p. 374.

Fuscous. Antennæ fuscous. Mouth parts yellowish. Mesonotum fuscous, with faint indications of the lighter vittæ, slightly tomentose. Halteres fuscous, the pedicel lighter. Abdomen dark drown; hypopygium small. Legs, including coxæ, yellow; of the hind pair the femora, tibiæ and metatarsi are apically brown. Wings hyaline, with a single, well-limited, quadrate, dark brown stigmal spot at the apex of the first longitudinal vein; marginal cell not widened at the stigma; third vein not rigidly straight, veins brown. 2.5 mm.

Tabasco, Mexico.

Syneches rufus Loew.

Cent., i, 24.

Rufous, opaque; antennæ, proboscis, palpi, halteres and legs concolorous; the posterior tibiæ often and the anterior and posterior femora sometimes fuscous. Color of the abdomen tending towards fuscous. Wings subhyaline, costal cell lutescent, second longitudinal vein meets the costa obliquely; beyond the end of the first vein there is a black rounded spot. 4 mm.

Illinois; New York: Ohio; Indiana; Wisconsin.

Syneches thoracicus Say (Fig. 84).

Hybos thoracicus Say, Compl. Writ., ii, p. 68.

Antennæ and rostrum yellow, pale; thorax ferruginous, with three dilated black lines; wings obscure, a dark red-brown stigma; feet reddish brown, the posterior pair darker than the others, tarsi yellowish; abdomen dull piceous. Rather more than one-fifth of an inch.

Pennsylvania, Maryland, Virginia, North Carolina, Kentucky, Ohio, Illinois, Kansas.

Syneches simplex Walker (Fig. 86).

Insecta Saundersiana. Dipt., p. 165.

Body dark brown, clothed with black hairs; eyes red, meeting above; facets large; mouth and feelers tawny; bristles of the feelers black; chest adorned with tawny stripes which are nearly confluent; abdomen linear, rather flat, black, longer and much narrower than the chest; tip dark tawny, shining; legs tawny; thighs and fore shanks partly pitchy; wings pale gray, brownish on the borders of the cross-veins and beneath the brand, which is dark brown; the wing is yellow on each side of the latter, and there is a dark brown spot beyond it; wing-ribs and veins brown; poisers large, tawny. 3 mm.

"United States."

Massachusetts, North Carolina, Georgia, Ohio, Ontario, Michigan, Indiana, Illinois, Wisconsin.

SYNDYAS Loew.

Small black species, differing from *Syneches* and *Hybos* in that the first section of the fourth vein is almost indistinct, and that the origin of the second vein is still more distant from the base of the wing.

Only the following species are known from North America.

Dorsum of abdomen opaque.....**dorsalis** Loew.
Abdomen bronzed black.....**polita** Loew.

Syndyas dorsalis Loew.

Cent., i, 26.

Wholly black, shining, the back of the abdomen opaque, clothed with fuscous tomentum. Thorax with very short hairs, abdomen with longer whitish hairs; bristles of thorax and scutellum black. Legs black-pilose, posterior tibiæ thick, clavate, and posterior metatarsi strongly incrassate. Halteres black. Wings hyaline, veins pale fuscous, second half of the costa blackish. 3.3 mm.

New York: Illinois.

Syndyas polita Loew (Fig. 83).

Cent., i, 27.

Wholly black, shining. Dorsum of thorax with very short pile, abdomen with longer, dirty white pile; thoracic and scutellar bristles black. Legs black-pilose, posterior tibiæ thick, moderately clavate, posterior metatarsi moderately incras-

sate. Wings hyaline, subcinerascent, the outer half of the marginal cell distinctly cinerascent, veins dark fuscous, apical part of the costa black. 3.3 mm.

Carolina: Massachusetts, Georgia, Alabama, Louisiana, Kansas, Ohio, Michigan.

MEGHYPERUS Loew.

Small black species. Antennæ short, apparently two-jointed. Bristle terminal, thickly pubescent. Proboscis very short. Eyes bare, males holoptic, females broadly dichoptic. Thorax large. Legs rather short, wholly glabrous, hind tibiæ somewhat broadened, metatarsi of all the legs lengthened. Wings unspotted, third vein simple, fourth vein forked; discal cell present, with two apical veins.

Third antennal joint twice as long as broad; abdomen shining.
nitidus sp. nov.

Third antennal joint but little longer than wide; abdomen opaque, velvety black.
occidens Coquillett.

Meghyperus occidens Coquillett.

Proc. Nat. Mus., 1895, p. 435.

Black, including antennæ, proboscis, palpi, halteres and legs; third antennal joint conical, slightly longer than wide, the arista two-thirds the length of the third joint. Thorax lightly gray pollinose; scutellum with six black bristles. Abdomen opaque velvet black; hypopygium small, porrect, slightly longer than the seventh segment. Legs rather robust; upper side of the hind femora with a fringe of white hairs, hind femora somewhat broader than any of the others, hind tibiæ greatly dilated; hind metatarsi nearly twice as thick as any of the others. Wings hyaline, stigma and veins brown, anal cell nearly as long as the second basal. 2–3 mm.

Southern California.

Meghyperus nitidus sp. nov. (Fig. 72, 73).

Length 2.5 mm.—Black over all, shining. Eyes of the male contiguous, of the female widely distant. Vertex of the female shining. Antennæ stout, third joint triangular, twice as long as broad, its arista equal to the greatest width of the joint, stout. Proboscis directed forward in the male specimen, downward in the females, nearly as long as the head-height. Thorax with pale yellow bristles, the acrostichals and dorsal rows distinct, scutellum with six pale bristles. Thorax lightly dusted on pleuræ and coxæ. Abdomen shining above and below, with scattered pale hairs. Legs with short pale hairs, but with no bristles, front femora moderately stout, the other femora less thickened; hind tibiæ gradually clavate, compressed; metatarsi about equalling the next three joints, not enlarged. Halteres black, pedicel slender, knob large. Wings clear hyaline, nerves yellowish, an infumated stigmal spot present, anal cell equalling the basals in length, anal angle rectangular.

Three specimens; Moscow, Idaho, June 17, 1895, Prof. J. M. Aldrich collector.

The tips of the abdomen of all three specimens are eaten by parasites, therefore nothing can be stated about the sexual characters.

ŒDALEA Meigen.

Small, slender, almost glabrous species of shining black color. Antennæ long, plainly three jointed, the first two joints short, the third lengthened, with a short, rather stout, two-jointed arista. Proboscis shorter than the head. Eyes of male contiguous, of female separated. Thorax prominent; abdomen long and slender; hypopygium small. Legs slender, except the thickened and lengthened hind femora, which are spiny beneath; the hind tibiæ are bowed, shorter than the femora. Wings with simple third vein; discal cell present, apically with three veins; anal cell (in our species) truncate; anal angle well developed, rectangular.

Oedalea ohioensis sp. nov. (Figs. 74, 75, 76).

Male. Length 3 mm.—Body black, shining. Occiput shining black. Eyes large, brownish red, facets small, eyes contiguous above antennæ. Face shining black, not broad, the sides parallel. Antennæ broken beyond the first joint which is piceous. Proboscis fusco-piceous, haustellate, equalling one-third the eye height; palpi not visible in this specimen. Thorax large, very shining, sparsely covered with pale short hairs, no bristles, except two small prealer and six piceous scutellar ones. Abdomen less shining, cylindrical, slender, a little longer than the head and thorax together, sparsely covered with short dusky hairs; hypopygium small, pointed, with a short thick dorsal process which is bent to the right. Coxæ, front and middle legs and hind femora pale testaceous, the hind tibiæ, except basal fourth, piceous; hind tarsi fuscous; front and middle legs plain, slender, hind femora thickened, reaching to the end of the abdomen, provided with a fringe of long pale hairs, beneath on the outer half with a double row of small black teeth; hind tibiæ two-thirds the length of the femur, at basal fourth geniculate. Halteres pale fuscous. Wings lightly infumated, stigma dark, all the discoidal veins reaching the margin, veins strong, dark fuscous, except the vein between the two basals, anal cross-vein perpendicular to the anal vein which is attenuate, but reaches the margin, anal cell shorter than the second basal cell, anal angle well developed, rectangular.

A single male, collected at Vinton, Ohio, by Prof. James Hine in the early part of June, 1900. This is the first reported occurrence of this genus upon this continent.

EUTHYNEURA Macquart.

Small, sparsely hairy shining species. Antennæ shorter than the head, in our species apparently two-jointed, the outer joint sublanceolate and with a very short arista. Proboscis in the American species not longer than the head. Eyes of the male contiguous, of the female separated. Thorax large. Legs rather long, the hind metatarsi slightly thickened, hairs of legs short. Third longitudinal vein

of the wings simple; discal cell emitting three posterior veins; anal vein (at least in our species) distinct beyond the anal cell.

Notwithstanding the fact that I have at hand no specimens of Mr. Coquillett's species, added to the superficial character of his descriptions, yet, without great hesitation, I have placed his species in this European genus.

Black, the legs largely yellow ..... **flavipilosa** Coquillett.
Yellow, a median vitta brown ..... **crocata** Coquillett.

Euthyneura flavipilosa Coquillett.

Microphorus flavipilosus Coq., Proc. Wash. Acad. Sci., 1900, p. 413.

Male.—Black, the hairs, stems of halteres, femora and tibiæ, yellow, knobs of halteres and the tarsi brown; eyes of male contiguous, third joint of antennæ sublanceolate, only slightly tapering to the apex, over four times as long as the style, proboscis noticeably shorter than height of head, mesonotum highly polished, scutellum bearing about ten marginal bristles, abdomen slightly polished, hairs of legs sparse and rather short, first joint of hind tarsi slightly thicker than that of any of the others; wings hyaline, stigma smoky brown, veins yellowish brown, last section of fifth vein one-fourth as long as the preceding section, sixth vein reaching almost to the wing margin. 2 mm.

British Columbia.

Euthyneura crocata Coquillett.

Microphorus crocatus Coq., Proc. Wash. Acad. Sci., 1900, p. 413.

Female. Yellow, the head and its members, a median vitta on mesonotum, dorsum of abdomen and apices of tarsi dark brown, third joint of antennæ sublanceolate, only slightly tapering to the apex, about twice as long as wide, five times as long as the style; proboscis about as long as height of head; hairs of body sparse and rather short, yellow; mesonotum polished, scutellum bearing about eight bristles, abdomen polished; hairs of legs very short, first joint of hind tarsi slightly thicker than that of any of the other tarsi; wings hyaline, veins yellowish brown, stigma almost obsolete, last section of fifth vein nearly half as long as the preceding section, sixth vein ending a short distance from the wing margin. 2 mm.

Alaska.

LEPTOPEZA Macquart.

Rather small, almost glabrous species of shining black or reddish color, with very slender abdomen. Antennæ shorter than the head, three jointed, the third joint elongate-oval, with a long terminal bristle. Otherwise as in *Oeydromia*. There is indication of a vein arising from the front of the discal cell and extending towards the margin.

Black; wings light brown ..... **flavipes** Meigen.
Wings hyaline ..... 2.

2. Posterior femora brown; antennæ short; hypopygium open.
disparilis sp. nov.

Femora yellow; antennæ longer; hypopygium comparatively closed.
compta Coquillett.

Leptopeza flavipes Meigen (Fig. 68).

Syst. Beschr., ii, 353.

Shining black, antennæ piceous, palpi yellow. Legs yellow, with brown tarsi, of the hind legs the coxæ, tips of the femora and the tibiæ brown; halteres yellow. Wings brownish. 4 mm.

Europe and North America.

One male; Dixie's Landing, Virginia. The wings are tinged with brown and the halteres are infuscated. The antennæ are much lengthened. The abdomen is piceous, with the apical margins of the segments black. The hypopygium is devoid of long hairs and is closed, its parts not so distinctly visible.

Leptopeza disparilis sp. nov. (Fig. 69).

Male. Length 4.5 mm.—Shining black. Antennæ black, a little shorter than the arista, third joint elongate, conical; antennæ one-fourth the head-height. Palpi and proboscis blackish brown. Postocular bristles black, cilia whitish. Thorax and abdomen with yellowish hairs and bristles. Hypopygium terminal, its parts distinct, filaments exposed, curved on the right side, straight on the left side, lower cleft shorter than the upper. Hind coxæ brownish, fore and middle coxæ, femora and tibiæ yellow, tarsi dusky from first joint, posterior femora and tibiæ brown, the tibiæ and metatarsi swollen, middle tibiæ with a series of three (four) long bristles on the outer side. Halteres light yellow. Wings hyaline, veins rather strong fuscous, no stigmal darkening.

Five males; California, Idaho.

This species is larger and more robust than the others.

Leptopeza compta Coquillett (Fig. 70).

Proc. Nat. Mus., 1895, p. 435.

Head black, gray pollinose, eyes contiguous; antennæ yellow, third joint elongate oval, twice as long as broad, the arista black and nearly as long as the antenna; proboscis and palpi yellow, proboscis less than one-third as long as the height of the head. Thorax, pleuræ, scutellum and metanotum yellow. Abdomen blackish brown, the first segment, narrow lateral margins and front margin of each segment yellow; venter yellow. Legs slender, light yellow, including the coxæ. Halteres light yellow. Wings grayish hyaline, stigma wanting. 4 mm.

New Hampshire, Massachusetts.

Numerous specimens of both sexes in the collection from Ohio, Tennessee, Illinois, Wisconsin and Idaho. The color varies from completely yellow, except the head and three basal spots on the abdomen black, to completely black, except the venter, coxæ and

legs rufous in the female, and venter, hind tibiæ and tarsi black also in the male. There is a complete gradation in specimens from a single locality.

OCYDROMIA Meigen.

Rather small, slender, almost glabrous species of black or reddish color. Antennæ shorter than the head, three jointed, the third joint oval, with an almost terminal, dorsal bristle. Proboscis short; palpi small, bare. Eyes glabrous, contiguous in the male, subcontiguous in the female. Thorax prominent; abdomen lengthened, femora and tibiæ simple. Wings with a simple third vein; a discal cell present, emitting two, and often a rudiment of a third, veins to the wing margin. Anal cell shorter than the second basal. Anal angle oblique, rounded.

Ocydromia glabricula Fallen (Figs. 66, 67).

Ocydromia glabricula Fallen, Empididæ, 33, 42 (1816).
Ocydromia perigrinata Walk., List, etc., iii, 488.

This species, which offers about a half dozen color varieties in Europe, is present in the United States as the following variety, described from ten specimens collected in widely distant localities:

Very shining; black above, more or less reddish below. Mouth parts and antennæ black. Occiput less shining than the thoracic dorsum. Margin of the scutellum, the humeri, pleuræ, coxæ and the ventral incisures of the abdomen more or less reddish. Legs yellowish red, more or less fuscous above, at the apices of the tibiæ and on the tarsi. Halteres fuscous. Wings hyaline, more or less infumated. Veins fuscous, somewhat reddish at the base. Anal vein almost reaching the wing margin, the cross-vein nearly perpendicular to it. Outer anterior bend of the discal cell with the fourth vein faint. Legs hairy, the hairs a little denser on the inner apical third of the male hind tibiæ; scutellum with two apical bristles; dorsum of the thorax almost glabrous; abdomen subglabrous; hypopygium black, small, with a few hairs. 5 mm.

Wisconsin, Wyoming, Vancouver Island. Ten specimens.

BRACHYSTOMA Meigen.

Almost glabrous species of brown-black color. Antennæ three-jointed, diverging. Proboscis shorter than the head, thick, vertical. Eyes of both sexes separated, but approaching beneath the antennæ in the male. Thorax large; abdomen slender, lengthened, in the male the genitalia are somewhat exposed, in the female the abdomen ends in a large, semi-transparent, bladder like, peculiar organ, in the lower side of which the ovipositor is enclosed. Wings

with a forked third vein; discal cell present, emitting three veins to the margin; anal cell longer than the second basal; anal angle gone.

Antennæ yellow, third joint brown; abdomen yellow, with dorsal dark spots. **robertsonii** Coquillett.

Antennæ piceous; abdomen dark fuscous ..... **occidentalis** sp. nov.

Brachystoma robertsonii Coquillett.

Proc. Nat. Mus., 1895, p. 393.

Head black, gray pollinose; face naked, scarcely half as wide as the front; antennæ yellow, the third joint, except at the base and style, brown; the third joint lanceolate, scarcely twice as long as broad, twice as long as the second; style curved, one-third longer than the third joint; proboscis yellow, palpi whitish. Thorax very shining black; pleura blackish, opaque light gray pollinose; metanotum and scutellum the same, the latter bearing two bristles. Abdomen compressed, shining, yellowish, a large dorsal black spot on each segment; hypopygium large, ascending, each upper lamella produced at the outer angles into a pair of long, erect, cylindrical, brown processes; middle lamellæ very large, each bearing at its tip a rather large curved process, in front of which is a small pilose tubercle, while behind it is a smaller tubercle bearing a few long whitish bristles; the inner side of each lamella bears a long, cylindrical, brown-tipped process; filament slender, arcuate, proceeding from apex of the rather large lower lamella. Legs including the coxæ yellow; front and hind femora slender, the middle nearly twice as thick as the front ones, their upper side thickly beset with very short black spines and with longer black bristles; inner side of middle tibiæ also thickly beset with very short black spines. Halteres yellow. Wings nearly hyaline, stigma wanting, first basal cell slightly longer than the anal, which is a trifle longer than the second basal. 4 mm.

Illinois, Tennessee, Ohio.

Brachystoma occidentalis sp. nov. (Fig. 89).

Male and Female. Length 4 mm.—Head and thorax black, abdomen fuscous. Face extremely narrow, gray (female), obliterated in the male; front moderately narrow, black; vertex and occiput shining. Antennæ equal to head, piceous, third joint subequal to first one, arista white, equalling antenna. Palpi white, proboscis yellow. Thorax shining, humeral callosity more or less fuscous; a prealar but no scutellar long bristles; pleuræ a little dusted with gray; halteres yellowish. Abdomen twice as long as thorax, fusco-piceous; of the female compressed in all the (dried) specimens, but the terminal segment greatly enlarged, balloon-like. The enlargement is sometimes translucent yellow bronzed. Abdomen of the male yellowish at the base, black apically, the hypopygium small, terminal, the upper lamellæ small, elongate, slender, the outer extremity filiform, the middle lamellæ moderate in size, the outer side excised, from the emargination of which arises a slender filiform appendage, the central filament slender, its base moderately thickened, strongly arcuate, and suddenly recurved near the tip. Legs slender, yellow, upper side of four posterior femora, all tibiæ and tarsi brownish; no setulæ present. Wings uniformly lightly infumated, veins fuscous, third vein forked, submarginal cell not closed, basal cells equal, anal cell a little longer, its cross-vein curved, no anal angle.

Numerous specimens; Washington, Idaho (J. M. Aldrich).

BLEPHAROPROCTA Loew.

Insects resembling *Brachystoma* in everything but the noninflation of the abdomen and the neuration of the wing. In this genus the first submarginal cell is squarely cut off by a cross-vein connecting the second and the third longitudinal veins.

The three basal cells subequal.....2
Second basal and anal cells long..... .....**binummus** Loew.
2. Base of anterior tarsi fuscous, of middle tarsi badius.....**serratula** Loew.
Anterior and middle tarsi black .....**nigrimana** Loew.

Blepharoprocta nigrimana Loew.

Cent. ii, 17.

Head black, shining. Antennæ black. Face very narrow, white-pollinose. Proboscis pale yellow. Thorax black, shining, bare, the lower half of the pleuræ white-pollinose. Scutellum and abdomen black; venter yellow. Hypopygium subglobose, black, apically with some erect pile pale yellowish. Coxæ and legs slender, yellowish. Anterior femora below near the apex with small black spines; middle femora not thicker than the others, pure yellow; posterior femora fuscous, except the base and very apex. Anterior tibiæ increasing in yellow color towards the apex, posterior fuscous, pale below near the apex. Anterior tarsi black, posterior dark fuscous, black at tip. Wings cinerascent, narrow, stigma obsolete, hairs of the hind margin not bent back; first submarginal cell closed; the three basal cells subequal. 2.7 mm.

Illinois (Le Baron).

Blepharoprocta binummus Loew (Figs. 91, 92).

Cent. ii, 16.

Head black, shining. First two joints of the antennæ pale yellowish, third joint black, the terminal seta black. Face very narrow, white-pollinose. Proboscis pale yellow. Thorax black, shining, bare, hind angles dark fuscous, lower half of the pleuræ white-pollinose. Scutellum black; abdomen black, shining, bare; venter yellowish; hypopygium globose, black, apically provided with a bundle of pale yellow hairs. Coxæ and legs slender, pale yellow. Anterior femora below near the apex with very small black spines; middle femora a little thicker than the others, curved, below near the base with rather sparse white hairs, behind—before the apex—with very closely-placed hairs; hind femora more slender on the outer half, infuscated. Anterior tibiæ simple, basal half of the middle tibiæ subfuscous, at the apex suddenly thickened and provided with long pale yellowish hairs; posterior tibiæ curved, fuscous, the extreme apex paler. The first three joints of the front tarsi decreasing in length, yellow, the last two black, dilated, on both sides short black-pilose, each with a silvery dot below, the outer one larger; of the middle tarsi the first three joints are yellow, the last two black; the hind tarsi have the last joint black, the next to the last dark fuscous, and the others yellow. Halteres white. Wings long, narrow, wedge-shaped, subcinerascent, stigma obsolete, posterior margin with long reflexed hairs in part; first submarginal cell closed; the two anterior basal cells much shorter than the anal. 3 mm.

District of Columbia.

Blepharoprocta serratula Loew (Fig. 90).

Cent. i, 23.

Female.—Head black, shining. Face very narrow, white-pollinose. Proboscis yellow. Thorax and scutellum black, shining, pleuræ sparsely white-pollinose. Abdomen lengthened, cylindrical, dark dull yellow, base and apex darker; venter luteous; last abdominal segment whole, not inflated, the upper and lower parts connate, the posterior margin provided with numerous white hairs. Coxæ and legs pale yellow, an anterior spot on the posterior femora, and almost the whole of the hind tarsi badious, last two joints of the tarsi piceous, the preceding joints of the anterior tarsi fuscous, of the middle badious; posterior femora unarmed, front femora near the tip below with very small spines. Halteres yellow. Wings very narrow towards the base, yellowish cinerascent, veins strong, yellowish fuscous; first submarginal cell closed. 3.3 mm.

Georgia (Gerhard).

EMPIDINÆ.

HILARA Meigen.

Rather large to small species of gray, black, or rarely reddish color. Antennæ as long as the head or longer, three-jointed, the third joint fusiform, compressed, with a two-jointed arista. Proboscis not longer than the head. Eyes of both sexes separated. Humeri prominent. Legs bare or bristly, the front metatarsi of the male nearly always much thickened. Wings with a forked third vein, the upper branch of which is not perpendicular to the remainder; discal cell with three veins issuing from its apex; anal cell shorter than the second basal, both bounded by a cross vein almost parallel with the hind margin; anal angle prominent.

The following artificial key contains all the species from North America, with the exception of Walker's three. In the collection are representatives of about a half dozen other species, but as most of them are species of poor characterization, it was deemed best to await more material.

Thorax green ..... **viridis** Coquillett.
Thorax reddish yellow ..... 2.
Thorax black or gray ..... 3.

2. Tarsi wholly brown, pile on inner side of middle tibiæ long. **testacea** Loew.
   Tarsi brown only at apex, elsewhere yellow, pile of inner side of middle tibiæ short ..... **lutea** Loew.
3. Front femora thickened; stigma weak ..... **femorata** Loew.
   Front femora not thickened ..... 4.
4. Thorax posteriorly with golden pubescence ..... **aurata** Coquillett.
   Thorax otherwise ..... 5.
5. Antennæ reddish at base ..... **umbrosa** Loew.
   Antennæ black ..... 6.

6. Abdomen yellowish at base ..... **basalis** Loew.
Abdomen unicolorous, dark ..... 7.
7. Stigma obsolete ..... 8.
Stigma at least fuscous ..... 12.
8. Legs fuscous to black ..... 9.
Legs paler ..... 11.
9. Thorax 4-vittate ..... **quadrivittata** Meigen.
Thorax evittate ..... 10.
10. Thoracic hairs blackish; halteres whitish; veins pale.. **leucoptera** Loew.
Thoracic hairs pale; halteres infuscated; veins dark ..... **bella** sp. nov.
11. Abdomen opaque ..... **macroptera** Loew.
Abdomen shining ..... **congregaria** sp. nov.
12. Front metatarsi not thickened; antennæ at least three times as long as the head, its style twisted ..... **johnsoni** Coquillett.
Male front metatarsi somewhat thickened; antennæ shorter, the style straight ..... 13.
13. Palpi black ..... 14.
Palpi testaceous ..... 23.
14. Knees more or less yellowish ..... 15.
Knees black ..... 18.
15. Wings blackish ..... **tristis** Loew.
Wings cinereous ..... 16.
16. Knob of halteres black ..... **mutabilis** Loew.
Knob of halteres fuscous ..... 17.
17. Thorax vittate ..... **trivittata** Loew.
Thorax evittate ..... **nugax** sp. nov.
18. Thorax vittate ..... 19.
Thorax evittate ..... 20.
19. Pile of abdomen yellow ..... **cana** Coquillett.
Pile of abdomen black ..... **baculifer** sp. nov.
20. Abdomen opaque ..... **unicolor** Loew.
Abdomen somewhat shining ..... 21.
21. Wings dusky ..... **velutina** Loew.
Wings subcinereous ..... 22.
22. Thorax shining ..... **atra** Loew.
Thorax velutinous ..... **carbonaria** sp. nov.
23. Abdomen at base fuscous ..... **basalis** Loew.
Abdomen wholly black ..... 24.
24. Femora, except tip, black; thorax with two obsolete vittæ. **brevipila** Loew.
Femora more or less yellow; thorax evittate ..... 25.
25. Knob of halteres black ..... 26.
Knob of halteres yellowish ..... 27.
26. All the femora testaceous ..... **gracilis** Loew.
The hind femora not testaceous ..... **nigriventris** Loew.
27. Pile of middle tibiæ long ..... **seriata** Loew.
No long hairs on middle legs; second joint of front tarsi of the male not proceeding from the tip of the metatarsus ..... **Wheeleri** Melander.

Hilara quadrivittata Meigen.

Syst. Besch., iii, p. 7.

Black, thorax cinereous, with four fuscous vittæ; halteres white; front metatarsi of the male thick, oblong. Head cinereous. The outer thoracic vittæ abbreviated in front. Abdomen and legs black. Wings hyaline, with a brownish margin, at the tip a little darkened. Abdomen of the male piceous, the hypopygium globose, reaching back on the dorsum of the abdomen. Tibiæ bristly. 4 mm.

Europe, Alaska (Kincaid).

Hilara umbrosa Loew.

Cent. ii, 34.

Head black, cinerascent, with whitish pollen, except for the front. The first two joints of the antennæ reddish, fuscous above, the third black. Palpi fuscotestaceous. Dorsum of the thorax subcinerascent, the pollen sparse, closely black-pilose. Abdomen concolorous with the thorax, with short black pile. Coxæ and legs pale testaceous, the posterior tibiæ and all the tarsi dark grayish. Wings cinereous, darker in the outer half, stigma blackish. 4.6 mm.

Illinois (Le Baron).

One male; Wood's Holl, Massachusetts, is probably the same as Loew's species. It is characterized thus:

Vertex opaque black, face cinereous; proboscis as long as the head, labella extending to the tip of the proboscis; palpi directed forwards, fuscous, with long hairs below. Thorax with a few short hairs, serially arranged and parted outwardly from the middle; scutellum with six long and several more short bristles. Hypopygium pedunculate, compressed, black, lamellæ widely opened, filament long, slender, extending forward, entirely visible, apically fuscous. Legs rather stout, luteo-fuscous, tarsi dusky, closely covered with short, dense, dusky hair; the inferior edges of all the femora with short black bristles, each tibia with several long, slender, black bristles on the outer side; coxæ plumose, fore and middle ones anteriorly and hind ones outwardly, with dense black hairs; front metatarsi a little longer than the three following joints, but little thicker than the tip of the tibia. Wings but little darker apically.

Hilara femorata Loew.

Cent. ii, 35.

Head black, opaque, antennæ and palpi black. Thorax and abdomen black, shining, with very short pubescence. Legs black, the knees, apex of the front tibiæ and the front tarsi brown, the posterior tarsi often fuscous, sometimes lighter; the front femora of both sexes much thickened, the male front metatarsi thick. Halteres black. Wings hyaline, the veins fuscous, stigma cinerascent, very faint. 2.6 mm.

Maryland (Osten Sacken), New Jersey, Ohio, Wisconsin.

Hilara velutina Loew.

Cent. ii, 36.

Wholly black. Head velutinous, black-pilose, antennæ and palpi black. Thorax opaque, velvety, black-pilose. Scutellum moderately shining. Abdo-

men concolorous with the scutellum, black-pilose. Legs wholly black, with short black pile; the anterior metatarsi of the male oblong, incrassate. Wings blackish gray, the stigma dark fuscous.

District of Columbia (Osten Sacken).

Hilara unicolor Loew.

Cent. ii, 37.

Head black, with black pile, the occiput cinereous-black, antennæ and palpi black, the proboscis very short. Thorax cinereous-black, opaque, covered with rather close black pile. Scutellum concolorous with the thorax. Abdomen black-cinereous, opaque, with black pile. Legs wholly black, with short black pile, the hind tibiæ covered with somewhat longer black pile; the front metatarsi (male) thickened. Halteres black. Wings pale cinerascent, stigma black. 3 mm.

Maryland (Osten Sacken), Massachusetts (G. de N. Hough).

Hilara nigriventris Loew.

Cent. ii, 38.

Head black, with black pile, antennæ concolorous, occiput cinereous. Palpi yellowish, fuscous at base. Proboscis almost equal to the head. Thorax black-cinereous, closely black-pilose. Scutellum concolorous with the thorax. Abdomen black, shining, with black pile. Anterior coxæ yellowish, fuscous at base, posterior coxæ generally wholly black, often testaceous at the tip. Legs black, with short black pile, the base and the very tips of the front femora always yellowish, the base of the middle femora less often testaceous; front metatarsi of the male oblong, incrassate. Wings very pale cinerascent, stigma black. 2.6 mm.

Pennsylvania (Osten Sacken).

Hilara trivittata Loew.

Cent. ii, 39.

Subopaque, black-cinereous. Head black, the frontal triangle larger than in the other species, it and the face cinerascent. Antennæ black. Palpi black, subcinerascent. Proboscis a little shorter than the head. Thoracic dorsum opaque, with fusco-cinereous pollen, three almost complete fuscous vittæ present, the black pile very short. Scutellum and pleuræ concolorous. Abdomen subopaque, with fusco-cinereous pollen, clothed with very pale subfuscous pile. Legs black, the pile very short. Wings cinereo-hyaline, stigma dark fuscous. 4.3 mm.

Illinois (Le Baron).

This species is very common in central Texas during the very early part of spring. For an account of its habits see *antea*, p 200.

Hilara mutabilis Loew.

Cent. ii, 40.

Black. Head black, antennæ and palpi black, proboscis a little shorter than the head. Thoracic dorsum clothed with rather long black pile, and covered with cinereous pollen, so that seen from the side it is wholly cinereous, viewed from above it seems marked with three black vittæ, the middle one complete, the side ones much shortened. Scutellum concolorous with the thorax. Abdomen

black, almost shining, with sparse black pile. Legs black, with short black pile, the tips of the knees yellow. Halteres black. Wings dark cinereous, stigma black. 2.2 mm.

Illinois (Le Baron).

Hilara brevipila Loew.

Cent. ii, 41.

Black, subopaque. Head black, the occiput cinerascent, with whitish pollen. Antennæ black. Palpi yellowish. Proboscis shorter than the head. Thoracic dorsum subcinerascent, with fine white pollen, with two faint approximated blacker vittæ, and clothed with short blackish pile. Scutellum same color as the thorax. Abdomen black, almost shining, very faintly cinereo-pollinose, black pilose. Legs black, the knees yellowish, the pile short and black, the tibiæ and metatarsi of the front and hind legs provided with a little longer pile above, anterior metatarsi of the male incrassate. Halteres black. Wings hyaline, stigma dark fuscous. 4.2 mm.

Illinois (Le Baron).

Hilara atra Loew.

Cent. ii, 42.

Black, shining. Head black, black-pilose, antennæ and palpi black; proboscis shorter than the head. Thoracic dorsum black, shining, very slightly cinereous-pruinose, clothed with rather long black pile. Scutellum same color as the thorax. Abdomen black, shining, black-pilose, the somewhat lengthened hypopygium concolorous. Halteres black. Legs wholly black, with short black pile, the front tibiæ and the front metatarsi of the male strongly thickened, bearing rather long pile above. Wings subcinerascent, stigma almost black. 2.2 mm.

Illinois (Le Baron), Massachusetts, Colorado, N. Mex.

Hilara leucoptera Loew.

Cent. ii, 43.

Black, moderately shining. Head black, occiput cinerascent, with whitish pollen. Antennæ black, the first two joints blackish brown. Palpi black. Proboscis a little longer than the head. Dorsum of the thorax subcinerascent, with fine whitish pollen, bearing blackish pile. Scutellum concolorous with the thorax. Abdomen black. Legs fuscous, in mature specimens almost black, knees dirty white. Halteres whitish. Wings hyaline, whitish, anterior veins pale yellowish, remaining veins dull whitish, stigma very weak; anterior branch of the third vein sharply ascending; second submarginal cell very short. 2.5 mm.

Florida (Osten Sacken).

Hilara gracilis Loew.

Cent. ii, 44.

Head black, occiput cinereous. Antennæ black. Palpi yellowish. Proboscis about equal to the head. Thorax cinereous, not vittate, opaque, clothed with black pile. Scutellum the same color as the thorax. Abdomen black, moderately shining, black-pilose, faintly cinereo-pollinose. Legs testaceous or slightly fuscous; tibiæ fuscous, the base of the anterior ones, however, often testaceous;

tarsi dark brown, front metatarsi of the male oblong, incrassate, not provided with longer pile. Halteres black. Wings nearly hyaline, stigma dark brown. 3 mm.

Pennsylvania (Osten Sacken).

Hilara basalis Loew.

Cent. ii, 45.

Black, almost shining. Head black, occiput subcinerascent. Antennæ black. Palpi yellowish. Proboscis shorter than the head. Dorsum of thorax subcinerascent, with very fine whitish pollen, clothed with black pile. Scutellem same color as the thorax. The basal half of the abdomen testaceous or a little fuscous, the apical half black, very faintly cinereous-pollinose. Legs yellowish, tarsi except the base fuscous, the first joint of the fore tarsi of the male strongly thickened; the front tibiæ and the front metatarsi possess somewhat longer blackish pile above. Halteres yellowish brown. Wings gray, stigma dark brown. 3.3 mm.

Illinois (Le Baron).

Hilara macroptera Loew.

Cent. iii, 32.

Dark gray, opaque. Head concolorous, black-pilose. Antennæ black, the first two joints dark brown. Palpi piceous, provided with some longer black hairs. Proboscis black, rather thick, shorter than the head. Dorsum of the thorax not vittate, provided with rather long black pile. Abdomen black, opaque, black-pilose. Legs pale yellow, black-pilose, the outer half of the tibiæ and the whole of the tarsi black; the front metatarsi of the male moderately thickened, and the front tibiæ bearing very long black hair above. Halteres yellowish. Wings very large, distinctly grayish, subhyaline, pale yellowish at the base, veins subfuscous, pale yellow at the base, stigma elongate, cinereous, very faint. 2.7 mm.

District of Columbia (Osten Sachen).

Hilara lutea Loew.

Cent. iii, 33.

Yellow, opaque, clothed with short and sparse black hair. Head blackish cinerascent, with whitish pollen. The basal joints of the antennæ fuscous (the third joint wanting). Palpi yellow; proboscis black, thick, shorter than the head. Pleuræ faintly marked with grayish spots. Abdomen marked with basal blackish fascia on each segment. Legs paler than the rest of the body, the very tip of the tarsi fuscous, and the fore metatarsi of the male incrassate. Halteres pale yellow. Wings almost hyaline, pale grayish yellow, veins yellow, posterior ones subfuscous, second longitudinal recurved towards its apex, the front branch of the third vein obliquely ascending, 2.5 mm.

District of Columbia (Osten Sacken).

Hilara tristis Loew.

Cent. v, 62.

Wholly black, black-pilose, opaque, antennæ, head, hypopygium, halteres and legs concolorous, the pedicel of the halteres and the knees testaceous. Front wholly velvety. Dorsum of the thorax sprinkled with very sparse, pale cinere-

ous pollen, with three darker, almost obsolete vittæ. Legs slender, covered with short pile and a few black hairs, the front metatarsi of the male moderately thickened, oblong, except for the usual hairs, bearing three or four setæ above. Wings blackish, stigma black. 4 mm.

New Hampshire (Osten Sacken).

Hilara seriata Loew.

Cent. v, 63.

Front black, a short vitta ascending from the antennæ more shining. Antennæ black, palpi testaceous. Thorax cinereous opaque, with no vittæ, the pile and the black setæ arranged in regular rows. Scutellum concolorous. Abdomen black, moderately shining, black pilose. Legs together with the coxæ testaceous, the front tibiæ towards the apex, and the hind ones, except the base, fuscous, all the tarsi almost black; the front metatarsi of the male thick, ovate; the middle tibiæ clothed with erect and rather long pile. Halteres testaceous. Wings cinereous, stigma dark gray. 2.5 mm.

New Hampshire (Osten Sacken).

NOTE.—Very similar to *Hilara gracilis*, but the thoracic pile arranged in regular series and the hairs of the middle tibiæ show a difference.

One specimen from New Jersey seems referable to this species. The stigma is nearly obsolete, however; all the tibiæ are strongly plumose, while the middle metatarsi, as well as the front ones, are thickened. The size is larger than Dr. Loew has indicated.

Hilara testacea Loew.

Cent. v, 64.

Dark yellow, opaque, clothed with black, rather short and sparse hairs. Head black, cinerascent, with whitish pollen. The basal joints of the antennæ dark yellow, the third joint and its style black. Palpi luteous. Abdomen ringed with blackish fasciæ at the base of the individual segments, the fascia often wanting on the first segment. Legs a little lighter than the rest of the body, tarsi wholly fuscous, the apex of the posterior tibiæ often infuscated; front metatarsi of the male thickened; the middle tibiæ provided with long pile below. Halteres yellowish. Wings cinereous, towards the costa yellowish, stigma subfuscous. 2.8 mm.

New Hampshire (Osten Sacken).

NOTE.—This must not be confounded with *Hilara lutea*, which has less cinereous wings and the middle tibiæ with shorter pile below.

Hilara Johnsoni Coquillett.

Proc. Nat. Mus., 1895, p. 395.

Black; the palpi, halteres, coxæ, femora and tibiæ yellow. Eyes of male separated over twice the width of the lowest ocellus. Head, thorax and scutellum opaque gray pollinose, that on the thorax somewhat yellowish, their short pile and bristles black; scutellum bearing four bristles; abdomen subshining, its pile rather long, black. Wings hyaline, stigma dark brown. Proboscis of male

slightly over one-half as long as, in the female fully as long as, the head height. Antennæ of male excessively long, over three times as long as the head, the female antennæ three times as long as the head, the third third joint is much the longest, its style coiled spirally. 4 mm.

Eufaula, Alabama (C. W. Johnson). Numerous specimens.

Hilara cana Coquillett.

Proc. Nat. Mus., 1895, p. 395.

Wholly black, including the palpi and knees. Head opaque gray pollinose, the pile black. First two antennal joints subequal in length, the third three times as long as the second, style nearly as long as the third joint. Proboscis as long as the height of the head. Eyes widely separated. Thorax opaque gray pollinose, marked with three brownish black vittæ, pile and bristles black; pleura naked. Scutellum bearing four black bristles. Abdomen and hypopygium opaque gray pollinose, the pile largely yellowish. Legs bearing rather long scattered pile, none of the femora unusually stout, front tibiæ more robust than the middle ones, front metatarsi greatly enlarged. Wings hyaline, stigma grayish black. In the female the front tibiæ are not thicker than the middle ones, and the front metatarsi are not enlarged. 4 mm.

Southern California (Coquillett).

Hilara viridis Coquillett.

Proc. Nat. Mus., 1895, p. 395.

Shining metallic green, the pleura largely black; antennæ, proboscis, hypopygium and legs yellowish brown; eyes separated the width of the lowest ocellus; proboscis slightly shorter than the height of the head; halteres black; pile and bristles of entire body black; scutellum bearing only two bristles; wings hyaline, veins yellowish, anterior branch of the third vein perpendicular to that vein. 2.5 mm.

Jamaica, West Indies (Cockerell).

Hilara aurata Coquillett.

Proc. Wash. Acad. Sci., 1900, p. 411.

Black, the first two antennal joints and the legs dark brown, the knees and halteres yellow; upper part of the occiput and sides of the front velvet black, middle of front below the lowest ocellus, face, cheeks and lower part of the occiput gray pruinose; eyes of male almost as widely separated as the posterior ocelli, third joint of the antennæ conical, slightly longer than broad, subequal in length to the style, proboscis as long as the height of the head, hairs of palpi and underside of the head whitish, those of the occiput yellowish brown; thorax slightly polished, marked with three, indistinct, black vittæ, almost bare, in the middle, behind the suture, with a golden yellowish pubescence, no hairs in front of the halteres, scutellum bearing four bristles and a few short hairs; abdomen slightly polished, its hairs yellow, hypopygium of male small, nearly bare; legs destitute of long bristly hairs, first joint of front tarsi of the male greatly swollen; wings hyaline, veins yellow, stigma pale yellowish, venation normal. 4 mm.

One female; July, Kukak Bay, Alaska (Kincaid). One male; Eastport, Maine (Nat. Mus.).

Hilara Wheeleri Melander (Fig. 95).

Psyche, 1901, p. 214.

Opaque true black, covered with a very fine gray-glaucous coating. Head, thorax and abdomen with a few pale short hairs in addition to the dark bristles. Antennæ black, short, third joint short, conical, its arista equal to itself. Palpi testaceous, with pale hairs; proboscis piceous, generally less than one-half the head height. Thorax not vittate, its short hairs irregularly, almost serially arranged: scutellum with four black bristles, the inner pair long. Abdomen opaque-black, most often compressed in the male and cylindrical or depressed in the female; no conspicuous bristles, the short sparse pubescence pale; hypopygium not of greater depth than the abdomen, sessile, rarely distinctly separated from the abdomen above, compressed, its lateral valves subglabrous, the dorsal filament thick, but almost always hidden. Legs fuscous to piceous. The males as a rule have the legs darker, but the fore tibiæ are always fuscous. The pubescence is pale yellow; no conspicuous macrochætæ are present, though the hairs of the upper edge of the male fore tibiæ are longer. The middle and hind coxæ are black, the fore coxæ more or less fuscous; tarsi black, the remainder of the legs variable in color, from fuscous to piceous. The front metatarsi of the males enlarged, ovoid, the distal third of the inner side is excised for the reception of the remainder of the tarsus, which thus is not attached to the tip of the metatarsus. The front tibiæ of the males are somewhat thickened. Wings cinereous-hyaline, stigmal spot faintly brown, neuration normal. 3.5 mm.

Wyoming (Wheeler).

In the lot of twenty specimens, one exhibited a peculiar case of tandem hermaphroditism. This specimen has the anterior part of the body formed as in the males, while the posterior portion is female. The reader is referred to the description in Psyche for an account of this case of gynandromorphism.

Species of *Hilara* described by Francis Walker.

Hilara plebeia Walker.

Trans. Ent. Soc. Lond., N. Ser., iv, p. 148.

Black; fore legs ferruginous; wings limpid, veins and stigma black; halteres tawny. 2.5 mm.

United States.

Hilara transfuga Walker.

List of Dipt. Ins., iii., p. 491.

Body black, clothed with short black hairs; eyes, mouth and feelers black; legs piceous, clothed with black hairs; wings dark brown; wing-ribs and veins black; brands black; poisers piceous. 4 mm.

Hudson's Bay. Ten specimens (Kincaid), Alaska; determination by Mr. Coquillett.

Hilara migrata Walker.

List, etc., p. 491.

Body black, hairy; eyes piceous; feelers and lip black, the latter short; legs dark tawny, clothed with short black hairs; wings gray; wing-ribs, veins and poisers piceous; wing-brands brown. 2 mm.

Hudson's Bay.

New species of *Hilara*.

Hilara baculifer sp. nov. (Fig. 96).

Length 3.25 mm.—Gray-black. Head opaque, dirty gray-brown, black-bristly; eyes deeply notched at the antennæ. Antennæ black, somewhat shorter than the head, third joint elongate, lanceolate, with a thickened arista a little shorter than itself. Proboscis black, one-half to two-thirds the height of the head. Palpi black, directed forwards, strongly beset with black hairs below. Thorax dull brownish gray, dorsum with three brown bristly vittæ extending to the scutellum, scutellum with four marginal bristles. Abdomen moderately shining on the upper surface, hypopygium not elongate, its lateral pieces not very shining, a mid-dorsal, anteriorly directed, terminal process present. Legs piceous, moderately shining, with black pubescence and bristles, the anterior tibiæ two-thirds of the length of the femora, moderately incrassate, on outer edge bearing a fringe of long bristles, closely placed near tip; anterior metatarsi greatly lengthened and thickened, in length exceeding the femora, with no long bristles, remaining tarsal joints short and thick. Wings evenly infumated, stigma a little darker, veins brown, strong.

The halteres are broken from all the specimens.

Thirty-two specimens; Tifton, Georgia, 1896.

This species is very distinct in the structure of the front pair of legs.

Hilara bella sp. nov. (Fig. 94).

Male. 3.5 mm.—Black, sparsely cinereous-pollinose. Head black, vertex and occiput velvet black, opaque. Face cinereous; a shining black triangle encroaches on the vertex above the antennæ. Antennæ black, short, less than one-half the length of the head, third joint conical, a little longer than its thickened style. Eyes shallowly emarginate at antennæ. Palpi black, with both pale and black hairs; proboscis black, not exceeding one-third the height of the head. Dorsum of thorax very lightly pale pubescent, almost blue-black when viewed from in back, subshining, cinereous when viewed from in front, the serial bristles pale, very short; pleuræ and coxæ cinereous. Abdomen finely cinereous, subshining, venter more gray; hypopygium cinereous, with smooth side pieces bearing a small posterior fringe of yellow hairs. Anterior faces of coxæ covered with yellow hair; femora and tibiæ subshining, black, except knees, tarsi more opaque black; anterior metatarsi moderately enlarged, slightly longer than the rest of the tarsus, not pilose; posterior tibiæ and tarsi densely covered with pale hairs. Halteres infuscated. Wings clear hyaline, veins firm, fuscous, stigma very obsolete, second submarginal cell normal.

A single male collected by Dr. Hough in Massachusetts.

Hilara carbonaria sp. nov.

Length 3 mm.—Black over all except wings (halteres missing of all the specimens, but most probably black also). Thorax, occiput and front black, velvety; ocellar triangle not raised; antennæ two-thirds the height of the head, third joint thickened, not finely pointed, twice as long as basal joints together, the arista short, thickened, eyes not deeply notched at antennæ. Proboscis slender, pointed, in length equal to the antennæ; palpi generally hanging down and then longer than proboscis. Thorax very little shining along sides when viewed from the side. Seen from the front the dorsum has two faint piceous-gray glabrous stripes extending nearly to the scutellum. Vertex, thoracic dorsum, margins of abdominal segments and base of hypopygium with small black bristles, longer on hypopygium; scutellum with four marginal bristles, the inner pair long. Abdomen moderately shining; hypopygium large, compressed, almost carinate, abruptly rounding the abdomen, no parts exposed. Legs wholly black, anterior metatarsus of the male not much enlarged, shorter than the remainder of the tarsus, but little thicker than the tibia, hairy, and with a few bristles above; bases of legs moderately shining; femora and tibiæ bristly; hind tibiæ straight, very slightly compressed. Wings whitish, veins pale fuscous, no stigma, first vein thickened near insertion in costa, venation normal.

Two males and five females; New Bedford, Mass., June 12th.

This species is distinct from *velutina* Loew by the coloration of the wings and the absence of stigma.

Hilara congregaria sp. nov.

Length 4 mm.—Head and thorax gray-black, faintly glaucous, slightly shining. Eyes narrowly, moderately deeply emarginate at antennæ. Antennæ black, third joint lanceolate, short, style thick, somewhat shorter than the third antennal joint. Occipital bristles brownish. Palpi testaceous, underside with pale hairs; each provided with a long dark seta exceeding the antenna in length, arising from the outer third of the underside. Proboscis black, generally shorter than one-half the height of the head. Thoracic bristles brown, acrostichals arranged in three series, thorax not vittate; scutellum with four marginal piceous bristles, the inner pair long; metathorax black, glaucous. The sparse marginal hairs of the abdominal sclerites pale. Abdomen piceous, sometimes fuscous at base; hypopygium compressed, not longer than the end of the abdomen, lateral valves small, serrate above, filament hidden. Legs pale testaceous, except the piceous front tarsi of the male, the hind tibiæ of the female and the gradually darkened remaining tarsi of both sexes; outer edge of anterior tibiæ and metatarsi of the male with pale downy hairs, at the tip of the tibiæ are a couple of stouter, darker hairs; no long hairs on remainder of legs, except on all the coxæ; anterior male metatarsi oblong, thickened, subequal to the remainder of the tarsus, anterior tibiæ slightly cylindrically thickened; female with anterior legs plain, a few short bristly hairs on anterior surface of middle femora, posterior femora curved, and posterior tibiæ incrassate, fusiform, as thick as the femora. Halteres testaceous. Wings clear hyaline, stigma at most very faint, veins light fuscous, neuration normal.

Thirteen males and seven females; Monterey Co., California, July 23, 1896. Collected by Dr. Wheeler.

On account of the rarely fuscous base of the abdomen, this species may become confused with *basalis* Loew, from which it may be readily distinguished by the brownish thoracic bristles.

This species, together with *nugax* sp. nov., is the *Hilara* mentioned by Mr. Wheeler in his paper on "Anemotropism and other Tropisms in Insects, p. 375,"* as dancing in swarms.

Hilara nugax sp. nov.

This species differs from *congregaria* as follows:

Male.—Thoracic and cephalic bristles slightly longer and stouter, darker, piceous or black. Antennal style more slender. Palpi piceous, with darker hairs. Hypopygial lamellæ not serrated. Legs darker testaceous, piceous or black from the middle of the tibiæ; anterior metatarsi without long hairs above, underside straight. Halteres fuscous. Wings cinereous hyaline; veins darker fuscous, stigma dark fuscous.

Female.—Differs from the male thus: legs lighter in color, tibiæ with more reddish, metatarsi not incrassate. The hind tibiæ of the female are not at all thickened.

Twenty nine males and twenty-four females; Monterey Co., California, July 3 to 23, 1896. Collected by Dr. Wheeler.

HORMOPEZA Zetterstedt.

Rather small species. Antennæ much shorter than the head, apparently two-jointed, the terminal joint ovate, compressed, with a short, thick end-bristle. Eyes of the male contiguous above. Hypopygium of the male rounded, consisting of two convex, shining, hemispherical plates, between which reaches a short hairy process. Legs simple. Wings as in *Hilara*.

The species are distinguished from *Hilara* by the contiguous eyes of the males, the simple metatarsi of the males, and by the structure of the antennæ.

Stigma and veins fuscous; third antennal joint oval; knob of halteres blackish. **nigricans** Loew.

No stigma, veins pale ..... 2.

2. Third antennal joint oval; halteres and legs luteous ..... **bullata** sp. nov.

Third antennal joint globose; halteres and legs fuscous. **brevicornis** Loew.

Hormopeza brevicornis Loew (Fig. 87).

Cent. v, 65.

Head black, eyes of the male contiguous. Front shining above the antennæ.

* Archiv fuer Entwickelungsmechanik der Organismen. 8th Band, 3rd Heft. 1899.

Antennæ very short; first two joints short, yellowish; the third joint globose, black; the terminal short style black, its basal joint thick, its apical joint slender. Proboscis very short, thick, blunt, blackish brown; palpi minute, recurved, dirty white. Thorax black, cinereo-pollinose, opaque, clothed with pale hairs. Scutellum concolorous. Abdomen black, shining, with pale hairs; hypopygium concolorous. Legs fuscous, the apex of the coxæ, the very base of the femora, and the knees often luteous. Knob of the halteres subfuscous. Wings whitish, veins pale, no stigma. 3.3-3.5 mm.

Yukon River (Kennicott); South Dakota, Idaho, Wyoming.

These specimens exhibit in addition the following characters: The eyes of the males are large, occupying nearly the whole head, the upper facets large, the lower very small, the two sizes of facets well-separated on a horizontal line. The abdomen of the male is more shining than in the female (of both sexes the base is almost translucent); the hypopygium is terminal, of moderate size, consisting of two convex, shining, side-pieces, and a dorsal short, backward-pointing, curved process. The head and thorax have a slight but distinct metallic tinge beneath the pollinous coating. The wings are broader, shorter and blunter than in *bullata;* the costal cell is well filled with brown. Lastly, the pulvilli are of dusky color and of normal size.

Hormopeza bullata sp. nov. (Fig. 88).

Female. Length 4.5 mm.—Head and thorax opaque black, abdomen shining black. Eyes widely separated. Antennæ a little more than one-third the eye height, stubby, black, third joint somewhat velvety, swollen, longer than broad, with a short, thick bristle. Palpi short, directed forward, luteous. Proboscis short, thick, black, in length one third the eye height. Postocular yellow bristles serially arranged. Thorax opaque-black, with a light cinereous or yellow tinge; bristles yellow, acrostichals and part of dorsals small, others long; scutellum with six long bristles, the apical pair of which are not close together. Pleuræ lightly cinereous-dusted. Abdomen compressed, shining black, with scattered, pale, short hairs; venter rufous to black. Coxæ and legs yellowish, uniformly colored, except the dusky tarsi; legs slender, tarsal joints oblong, gradually decreasing in length, four pairs of bristles on the hind tibiæ, hind femora with longest bristle-like hairs on the outer side near the tip, middle and front tibiæ with a few small bristles, pulvilli enlarged, pale yellow. Halteres yellow, dusky at extreme tip. Wings narrow, clear hyaline, nervures pale, brownish along costa, no stigma, anal angle prominent, costal cell opalescent.

While this species closely resembles *brevicornis*, its habitus is so different as to render it easily distinguishable. The larger size, the narrower, longer, more pointed wings, the large pulvilli, the oval third joint of the antennæ which also are a little longer, the opalescent costal cell, the opaque velvet black of the head and thoracic

dorsum, the black base to the antennæ, the solid black of the base of the abdomen, and the luteous halteres and legs, are all peculiar to this species.

Described from three females, from Jackson's Lake, Wyoming. Collected by Dr. Wm. M. Wheeler.

Hormopeza nigricans Loew.

Cent. v, 66.

Wholly black, with pale pile. Head concolorous, eyes of the male contiguous. Antennæ short, black, third joint oval, the basal joint of the short style thick, the apical one slender. Proboscis very short, thick, blunt, blackish brown; palpi small, recurved, dull white. Thorax opaque, cinereo-pollinose. Scutellum concolorous. Abdomen black, shining, hypopygium the same. Legs black, the apex of the coxæ and the knees luteous. Knob of the halteres blackish brown. Wings cinereous hyaline, stigma and veins fuscous. 4.1 mm.

Yukon River (Kennicott); Moscow, Idaho (J. M. Aldrich).

GLOMA Meigen.

Species of blackish or yellowish color. Antennæ shorter than the head, third joint oval, with a rather stout terminal arista, proboscis thick, not longer than the head. Eyes of the male contiguous above, of the female separated. Thorax rather prominent; abdomen compressed. Legs simple, the hind ones lengthened. Wings rather broad, the third vein imperfectly (?) forked; discal cell with three veins; anal cell shorter than the second basal, both bounded by a cross vein almost parallel with the hind margin.

Yellow, red above; tarsi fuscous towards tip.....**rufa** Loew.
Black, abdomen yellowish basally.....2.
2. Legs simple.....**obscura** Loew.
Front tarsi and middle tibiæ in part swollen and hairy.
scopifera Coquillett.

The generic position of *Gloma phthia* Walker* cannot be determined from his description. It is therefore useless to repeat the diagnosis.

Gloma rufa Loew.

Cent. v, 67.

Yellow, reddish above, black-pilose. Head black, cinereous with white pollen. Proboscis and palpi yellow. First two joints of the antennæ rather short, yellow, black-pilose; third joint black, ovate, apex subacute, the seta rather thick, black. Tarsi fuscous towards the apex. Wings grayish yellow, stigma tinged a little darker, veins pale fuscous, yellow towards base and costa. 5 mm.

New Hampshire (Osten Sacken).

* Walker, List of Dipterous Insects, etc., iii, p. 492.

Gloma obscura Loew (Fig. 93).

Cent. v, 68.

Black, black-pilose. Head black, proboscis fuscous, palpi blackish. Antennæ black, first two joints rather short, black-pilose, the third short, ovate, the rather thick seta black. Abdomen shining, black, or piceous, base on each side yellowish, almost pellucid. Coxæ and legs yellowish, the hind femora and tibiæ infuscated apically, the last two joints of the tarsi black. Halteres yellowish. Wings grayish fuscous, stigma a little darker, veins fuscous. 5 mm.

New Hampshire, Idaho.

The third vein is perfectly furcate in the specimen in the collection.

Gloma scopifera Coquillett.

Proc. Wash. Acad. Sci., 1900, p. 412.

Male. Length 6 mm.—Black, a humeral dot, the halteres, second and third segments of the abdomen, except middle of dorsum, underside of fourth segment, and the legs, yellow, the greater part of the coxæ, middle of femora, apices of tibiæ, last two joints of front and middle tarsi, and whole of hind tarsi, except bases of first two joints, brown; all hairs and bristles black. Third joint of antennæ slightly longer than wide, less than half as long as the style. Thorax somewhat opaque, thinly gray pruinose. Abdomen slightly polished. Front tibiæ at apices bearing a dense cluster of rather long bristly hairs, last two joints of the front tarsi greatly dilated and fringed along the sides with short bristly hairs, middle femora beyond the middle of the underside bearing a cluster of about three long bristles, middle tibiæ swollen at middle of underside, the swelling densely covered with short, bristly hairs. Wings grayish hyaline, veins and stigma brown.

Alaska (Prof. T. Kincaid).

RAGAS Walker.

Small, slightly hairy species of black ground-color. Antennæ three-jointed, shorter than the head, the first two joints short, the third lanceolate, lengthened, provided with a short two-jointed arista, the second joint of which is very fine. Proboscis short, not porrect; palpi lengthened, provided with a few hairs beneath. Eyes of the female separated, of the male narrowly separated, the face long, the vertex short. Thorax short and rather broad, prominent. Legs rather long, intermediate femora of the male in our species without a spine. Wings with the third vein furcate, the upper branch not perpendicular; discal cell sending out three posterior veins; anal cell shorter than the second basal cell; anal angle not prominent.

Scutellum with six pale hairs..... **mabelæ** sp. nov.
Scutellum with ten black bristles..... **conjuncta** Coquillett.

Ragas mabelæ sp. nov. (Fig. 98).

Male. Length 3 mm.—Black species, covered with cinereous dust. Face very narrow, silvery, palpi white. Dorsum of the thorax diffused brownish, with four brown vittæ, the lateral two abbreviated anteriorly. Scutellum with six equidistant uniform pale marginal hairs. Abdomen slender, dusted with cinereous, the hypopygium terminal, projecting, globose and closed, dusted with cinereous, except beyond the margins of the broad, convex middle lamellæ. Legs slender, simple, devoid of any bristles, yellow, the tarsi apically and the hind legs from the middle of the femora outwardly brown; pulvilli small, square, empodium linear. Wings hyaline, with a very faint brownish tinge, veins dark brown; the costa curves outward to accomodate itself to the elongate faint stigma; marginal cell extending to the middle of the second submarginal cell; anal vein vanishing.

One male; Moscow, Idaho (Prof. J. M. Aldrich).

This is the first reported occurrence of this genus in America.

Ragas conjuncta Coquillett.

Empis conjuncta Coq., Proc. Wash. Acad. Sci., 1900, p. 411.

Black, the halteres and legs dark brown; venter of abdomen dark brown. Eyes of male contiguous. Third antennal joint linear, long, its style minute. Proboscis shorter than the head. Hairs and bristles of thorax and scutellum black; thorax very thinly gray pollinose, not distinctly vittate, scutellum bearing ten marginal bristles; abdomen slightly polished, hypopygium wholly and sparsely covered with bristly hairs, the dorsal piece bearing a pair of long subcylindrical, fleshy processes, which are covered with short hairs, filament free. Wings hyaline, veins and stigma brown. 2.5 mm.

Alaska (Prof. T. Kincaid).

The characters given above have been drawn from the description of *Empis triangula* Coq., which the present species is said to resemble, except in its generic characters. Its position in the genus *Ragas* is evident from Mr. Coquillett's résumé: "classified by its short proboscis, this species would be placed in the genus *Hilara;* but its elongated third antennal joint with the minute style, the contiguous eyes of the male and the slender first joint of his front tarsi, indicate a nearer relationship with the typical species of the genus *Empis.*"

In the structure of the appendages of the hypopygium this species departs widely from *mabelæ*, but this difference is not of generic importance, as similar cases occur, *e. g.*, in the genus *Brachystoma*. The females of *B. occidentalis* and *vesiculosum* Fab. are undoubtedly related, but the males of the former bear prominent annexes to the lamellæ while in the latter they are wanting, judging from Mr. Mik's description.*

* Ent. Nachr., 1894, p. 154.

LAMPREMPIS gen. nov.

Lamprempis Wheeler et Melander (Subgen. *Empis*), Biol. Cent. Am., 1901, Dipt. Suppl., p. 366.

Small, short, broad, greatly humpbacked, metallic blue or blue-green flies. Eyes of the male contiguous. Thorax often with bushy short pubescence, the macrochætæ much reduced, either wanting or hair-like, even on the scutellar margin. Hypopygium prominent, three lateral valves varyingly developed, the central filament much reduced, generally apparently wanting. Legs of both sexes ornamented, of the female ciliate with scales or hairs on the edges, of the male sometimes more or less pennate. *Chichimeca* possesses remarkable processes on the male hind leg which are developed not alone at the knee, where similar processes are developed in typical *Empis*, when they occur, but also on the distal portion of the tibia and on the metatarsus; in *benigna* and *superba* also, there are thickenings in the same places; *violacea*, the only other species of which the male is known has no similar thickenings of the legs, but has instead the pennate ornamentation. Wings with the characteristic brownish tinge of the Mexican flies, more or less developed, most conspicuous along the costa; the veins narrow, brownish, becoming faint posteriorly, especially the anal and sometimes the fifth also; the third vein furcate far beyond the end of the marginal cell, its anterior branch perpendicular.

Wings hyaline, marked with black; hind legs of males with scales. **violacea** Loew.

Wings uniformly blackish; legs of male simple ..... **superba** Loew.

Wings hyaline or yellowish ..... 2.

2. Tarsi black; middle and hind femora and tibiæ with flat scales on both edges (female) ..... **cyanea** Bellardi.

Tarsi at most fuscous ..... 3.

3. Wings clear hyaline; legs not ciliate with scales (female) ..... **suavis** Loew.

Wings of a yellowish tinge ..... 4.

4. Scales dense on both sides of the middle and hind femora and tibiæ (female); hind femora, tibiæ and metatarsi each with a peculiar process (male); wings uniformly colored ..... **chichimeca** Wheeler et Melander.

Scales few on the upper side of the femora (female); wings darker on the anteroproximal portion ..... 5.

5. Hind tibiæ and metatarsi each with a brush of hairs (male); third antennal joint shorter than the first two united ..... **benigna** Osten Sacken.

Third antennal joint about equalling the first two. **diaphorina** Osten Sacken.

Lamprempis violacea Loew (Figs. 103, 104).

Cent. viii, 55.

Male.—Blue, shining, covered with fine black pile. Head blue-black; eyes

contiguous; first two joints of the anteunæ dull testaceous, third joint rather short, ovate, black, provided with a style equal to itself; proboscis short, piceous. Dorsum of thorax greenish blue; pleuræ piceous, opaque, shining blue before the base of the wings; pile in front of the halteres black. Color of the abdomen brassy blue, changing to violaceous towards the tip. Hypopygium small, short, black and black-pilose, supported by the last ventral segment which is arched and clothed with black pile; lateral lamellæ short, upper lamellæ excised; penis exposed, very slender towards the tip. Legs dark piceous, black-pilose, of the front and middle legs, the apical third of the femora, and the tibiæ except the tip, of the hind legs, the knees, the second and third joints of all the tarsi, together with the extreme apex and basal fourth of the first joint, pale lutescent; the front and middle tibiæ above with ordinary pile, towards the apex with compressed pile; the front and middle metatarsi above short-pennate; of the hind legs, the tibiæ and the femora compressed, the tibiæ pennate above, below with dense pile, the femora on both sides with feathery scales. Halteres blackish brown. Wings clear hyaline, the base, the costa, and the edges of the discal cell bordered very broadly with black, so that, except for a triangle extending from the axillary margin to the fourth vein, and except for the spot in the discal cell contiguous with the front margin of the triangle, the three posterior cells are hyaline, the basal half of the first and the base of the others excepted. The third longitudinal vein, besides the anterior, perpendicular, and slightly recurved branch sends another short branch into the first posterior cell, equidistant from the median cross-vein and the apex of the wing; discal cell broad, obliquely truncate; the fourth longitudinal and the intercalary veins slender, evanescent before the margin of the wing. 3.5 mm.

Mexico (Deppe, Berlin Museum).

One injured specimen labelled Mexico answers with this description, except that the hypopygium is broadly open, and evidently of different conformation.

Lamprempis superba Loew.

Cent. viii, 57.

Male.—Brassy black. Proboscis equal to the head and thorax combined, fuscous. Antennæ black, the first two joints black-pilose, the first somewhat long, the apical style whitish. Eyes contiguous. Thorax and scutellum brassy green, shining, clothed with short black pile. Pleuræ brownish black, opaque, with a small subalar callosity and a median spot blue-green, black pilose in front of the fuscous halteres. Abdomen blue-green, merging into very bright cupreous towards the apex and chalybeous at the very tip. Legs black, closely covered with short concolorous pile, the tibiæ and the first joint of the tarsi moderately thickened, the front femora except the tip luteous, and the other femora circled by a subapical, very broad, luteous ring. Wings black, the front branch of the third longitudinal vein ascending straight to the costa. 4 mm.

Cuba (Poey).

Lamprempis cyanea Bellardi.

Mem. d. Reale Accad. d. Scienze d. Torino, Ser. 2, vol. xxi, p. 199.

Female.—Metallic blue. Front broad, deep, shining, blue-black; first antennal

joint long, cylindrical, black, with long, dense, black hairs; second joint very short, black, black-pilose; third joint wanting. Proboscis equal in length to the thorax and head together. Occiput black, at the margin provided with long black bristles. Thorax much convex, black-pilose, shining, green-black, metallic, with faint vittæ; pleuræ and pectus jet black, from thence submetallic. Scutellum green-black, metallic, with long, black hairs on the posterior margin. Halteres wanting. Abdomen acute apically, cyaneous, metallic, black-pilose at the base. Front and middle legs short, hind ones gone; coxæ black; front femora broadly black at the base, apically yellow; front tibiæ broadly yellow at the base, and apically black; front tarsi wholly black, first joint long and much thickened; middle legs yellow, with the very base of the femora and the extreme tip of the tibiæ, and all the tarsal joints black; front femora and front and middle tarsi dark yellow-tomentose; front and middle tibiæ and middle femora with rather long yellow cilia. Wings hyaline, fuscescent towards the base; submarginal vein straight, perpendicular to the third vein. 4 mm.

Angang, Mexico (Saussure).

In addition to this diagnosis the following points drawn from a female specimen from Amola in Guerrero, Mexico, will be of service:—Third antennal joint shorter than the first two united, pointed, its slender style equalling its own length. Mesonotum evittate. Hind femora and tibiæ fringed with scales on both sides, hind metatarsi not fringed; front metatarsi elongate, flattened and fringed.

Lamprempis suavis Loew.

Cent. viii, 56

Female.—Front and face blue-green, shining; occiput chalybeous, moderately shining. Antennæ black, the first joint rather long, the third ovate, its bristle shorter than itself; proboscis a little longer than the head. Thoracic dorsum green, shining, chalybeous on the posterior margin. Pleuræ almost black, but green and shining before the base of the wings. Abdomen rather thick, bright chalybeous, shining. Femora piceous, extreme tip luteous; tibiæ lutescent, a little darker towards the tip, the apex of the hind ones fuscous; front tarsi fuscous, the middle joints lutescent, the first thickened; middle and hind tarsi pale lutescent, the last joints black. Halteres black. Wings very clear hyaline, veins fuscous; the first section of the fourth longitudinal vein altogether obsolete, its last part and the intercalary vein very slender, of a lighter color and vanishing before the tip of the wing; the sixth vein much abbreviated; the anterior branch of the third vein straight and perpendicular. 2.5 mm.

Mexico (Deppe, Berlin Museum).

A single female from Chilpancingo in Guerrero, Mexico, has the whole of the fourth vein uniformly developed.

Lamprempis chichimeca Wheeler et Melander (Figs. 100, 101, 102). Biol. Cent. Am., Dipt. Suppl., p. 368, Nov. 1901.

Male.—Shining metallic green. Face and occiput black, dusted with white. Eyes contiguous on the front. Proboscis nearly as long as the head. Antennæ

black; third joint shorter than the first and second joints taken together, very nearly the length of the first joint; style very short. Mesonotum shining, metallic blue-green, with three deep blue stripes anteriorly, and beset with erect and rather dense brownish black hairs. Abdomen metallic green, with black hair. Hypopygium small, black, with only the base of the filament exposed. Pleuræ shining black, metallic blue-green anteriorly, dusted with white posteriorly. Legs black, covered with black hairs; knees, fore and middle tibiæ and all the tarsi yellow. Fore metatarsi thickened, nearly as long as the remaining tarsal joints taken together. Middle legs plain. Hind femora on the inner inferior side with two slender finger-like processes, with an emargination between them; hind tibiæ on the inner side with a stout subapical scoop-shaped process, truncated and flattened at the extremity; hind metatarsi incrassate, somewhat concave on the plantar side, and bearing on the outer side a prominent pointed projection tipped with two small black spines. Halteres black. Wings tinged with brown, yellowish anteriorly; veins yellow; stigma fuscous, slender and inconspicuous; anterior branch of the third vein short, rectangular.

Female.—Color, especially of the abdomen, more metallic blue. Face shining metallic blue. Middle femora below, hind femora above and below, and the four posterior tibiæ on their inner and outer sides, with thick-set rows of black scale-like hairs. Middle and hind tibiæ grooved on the outer side. Fore metatarsi incrassate, as in the male, hind metatarsi less thickened, and the legs wholly without the peculiar processes of the male. Stigma of the wings obsolete. 4-5 mm.

Guerrero, Mexico (Smith).

Lamprempis diaphorina Osten Sacken.

Biol. Cent. Am., Dipt. Suppl., 1900, p. 215.

Female.—Antennæ black; third joint elongate, about as long as the first two united, with a short style. Occiput hoary, beset with black pile; front metallic green. Thorax metallic green, shining, with a vestige of three pollinose stripes on the dorsum, the latter sparsely beset with long, erect, black pile; meso- and sternopleura shining, metallic green; pteropleura black, slightly hoary; the fan-like row of bristles black; halteres black; metanotum slightly pulvernlent. Abdomen metallic bluish, greenish at the base. Legs brownish yellow, the tips of the tarsi brown; the first pair beset with moderately long, delicate hairs, their first tarsal joint long, swollen; on the middle pair the hairs are shorter and more dense, fringe-like, especially on the underside of the femora; the hind tibiæ are broad and flattened, and bear on each side a fringe of long, stout, almost scale-like hairs; similar fringes on the hind femora, but less conspicuous; coxæ black; trochanters brown. Wings with a pale brownish yellow tinge toward the root of the anterior margin; stigma hardly visible; hind margin grayish; the branch of the third vein nearly perpendicular; the first vein issuing from the discal cell turning anteriorly before its end; the first and second veins reach the margin, but are very thin and evanescent before it. Length about 4 mm.

Ciudad in Durango, Mexico.

Lamprempis benigna Osten Sacken.

Biol. Cent. Am., Dipt. Suppl., 1900, p. 215.

Male and Female.—Antennæ black; third joint a little shorter than the preced-

ing two joints united, the division or suture occupying two-thirds its length and very distinct, the style short and stout. Face and front very dark metallic, shining, almost black. Thorax metallic green, shining, beset with long, erect, black pile; pleura metallic green, shining anteriorly, black, slightly hoary posteriorly; halteres and the fan-like bristles in front of them black. Abdomen metallic green (male), or metallic blue, green at the base (female); male genitals black. Legs black, the last pair of coxæ slightly pulverulent at the base, the knees slightly brownish yellow, the tarsi brown and with their first joint but slightly incrassate; in the male beset with long, soft, blackish hairs, the tip of the hind tibiæ bearing on the underside a small brush of very short, stiff bristles (which produces the appearance of an incrassation), and the yellowish brown first joint of the hind tarsi having on the underside a similar brush of bristles at the base, followed by a distinct emargination; in the female the middle femora on the underside, the middle tibiæ, and the hind femora and tibiæ on both sides, beset with fringes of long scale-like hairs, the hind tibiæ broadened, and with a groove on the outside. Wings of the male subhyaline, with a slight yellowish tinge in the subcostal cell, especially in the stigma; in the female this yellow tinge is more extended and occupies the whole antero-proximal half; venation as in *E. diaphorina*.

Mexico.

EMPIS Linnaeus.

Species of three to nine mm. in length (an undescribed female of uncertain provenience, probably Yucatan, measures ten mm.), often nearly glabrous, sometimes covered with long hairs, of black, gray or yellowish body color more or less completely concealed beneath a coating of grayish pollen, often with the legs peculiarly ornamented, the males with processes or swellings, the females sometimes with scale-like hairs. Antennæ generally longer than the head, the second joint shorter than the others except very rarely, the first two joints more or less cylindrical, the third compressed, lengthened, with a short, bristle-like terminal style. Proboscis at least as long as the head, frequently longer, stout, adapted for piercing, the labella of variable length. Eyes of the male separated or contiguous, of the female always separated. Thorax large, generally vittate, the darker vittæ generally in pairs; abdomen long, in the male generally narrow and with large genitalia of peculiar and variable form, consisting of two paired valves and a central filament, in the female generally flattened at the base and pointed apically, ending in two small narrow lamellæ. Sometimes the male venter is armed with processes near the tip and much distorted. Legs generally slender, more or less hairy and bristly, more prominently so in the male than in the female, the hind ones longest, often compressed and then generally ciliate with scales or hairs

along the edges; hind legs of the male frequently armed at the knees or trochanters; fore metatarsi of the males sometimes enlarged. Wings generally narrow, with the front and hind margin more or less parallel, the discal cell always present, emitting three simple veins to the wing margin; third vein always furcate; anal cell shorter than the second basal, both bounded by a vein nearly parallel with the hind margin of the wing; anal angle prominent, but rarely projecting.

Several attempts have already been made to divide this complex genus into groups of species. Dr. Loew in a series of papers in the Berliner Entomologischer Zeitschrift, vol. xi–xiii, has grouped the European species about a few typical forms, and the same may be done with more or less completeness in the case of the American species. The genus *Enoplempis*, erected by M. Bigot* for those species of *Empis*, the males of which have armed hind knees, fell in Mr. Coquillett's Revision. His reasons for the abandonment of the genus were that it was established on characters found in the male sex only, and that the females were indistinguishable from typical *Empis*. Although this may not be a sufficient reason for the dissolution of a genus; for example, witness those dolichopodid genera founded on male characters alone, such as *Polymedon*, which are considered valid, yet *Enoplempis* is not here reinstated with generic value, as it merges with other *Empis* through the species *nodipes* on the one side and *teres* on the other.

The subgenus *Lamprempis*† deserves a better fate, for as yet, it is very exclusive and probably will always remain so. Its distinctive character, a color difference, it is true, is yet so deep seated that it can be regarded as morphological. Intergrades between the yellows and blacks of *Empis* are common, but an intergrade between the metallic blue of this group and the ordinary color of *Empis* would be difficult to conceive of, and hence, especially as the species all present a similar facies which is quite different from that of the rest of the group, we feel justified in raising *Lamprempis* to the rank of a genus.

Empimorpha, founded by Mr. Coquillett on *Empis barbata* Loew, has been allowed to remain as a distinct genus, although its relationships with the group *Aldrichii* of *Empis* are quite evident.

* Bull. Soc. Ent. France, 1880, p. 47.

† Wheeler et Melander, Biol. Cent. Am., Nov., 1901, p. 366.

The species *E. sociabilis* Williston* (synonym *Rhamphomyia abdita* Coquillett) is not included in the table as it is a true *Rhamphomyia*, and was originally given as *Empis* only through a typographical error.

Two of Walker's species, *agasthus*† and *reciproca*‡ have been dropped, and, likewise, Loew's *poplitea* has been omitted from the table on account of insufficient characterization.

In attempting to place species with the aid of the following table, too much reliance must not be placed on the wording, as this genus, and indeed the whole family as well, is in a state of extreme "morphological restlessness." The instability of the species manifests itself often in the coloration, often in the chætotaxy. Stress is laid in the key on the number of scutellar and metapleural bristles, but this character is variable and often misleading, so that only within certain limits can it be accepted. Moreover, greasy, immature, or rubbed specimens may often lead one astray; thus it is only after a comparative knowledge of a number of forms that a determination may be relied upon.

More or less yellow species, *i. e.*, pleuræ largely yellow, thoracic dorsum at least partly yellow along the sides ..... 2.
Black, gray, or brown species; pleuræ never yellow ..... 22.
2. Occiput black, more or less cinereous dusted ..... 3.
Occiput yellow ..... 17.
3. Thorax and abdomen unicolorous, red ..... 4.
Thorax and abdomen more or less vittate with blackish ..... 5.
4. Stigma distinct; anterior branch of the third vein perpendicular; body with no black bristles ..... **rubida** Wheeler et Melander.
Stigma wanting; second submarginal cell acute; body with black bristles. **rufescens** Loew.
5. Halteres blackish; thorax with a longitudinal black stripe. **leptogastra** Loew.
Halteres whitish or reddish ..... 6.
6. Dorsum of thorax evenly blackish; antennæ black ..... 7.
Dorsum of the thorax with darker vittæ ..... 10.
7. Sides of the thorax and venter with long yellow pile. **lanventris** Escholtz.
Not yellow pilose ..... 8.
8. Tibiæ apically blackish ..... **loripedis** Coquillett.
Tibiæ yellow ..... 9.
9. Abdomen opaque ..... **amytis** Walker.
Abdomen shining ..... **gladiator** sp. nov.

* Kans. Univ. Quart., vol. ii, p. 76.
† List of Dipt. Ins, iii, p. 496.
‡ Trans. Ent. Soc. Lond., N. Ser., iv, p. 147.

10. Thorax trivittate ..... **tridentata** Coquillett.
Thorax not trivittate ..... 11.
11. Abdomen largely black ..... 12.
Abdomen largely yellow ..... 16.
12. Antennæ black ..... 13.
Antennæ fuscous at base ..... 15.
13. Shining; abdomen in part yellow ..... 14.
Abdomen wholly black ..... **ollius** Walker.
14. Tip of hind tibiæ black ..... **loripedis** Coquillett.
Tip of hind tibiæ yellowish ..... **gladiator** sp. nov.
15. Tip of femora black ..... **endamidas** Walker.
Tip of hind femora concolorous with rest, reddish ..... **abcirus** Walker.
16. Base of abdominal segments fuscous, rest yellow ..... **sordida** Loew.
Tip of abdominal segments blackish, rest yellowish ..... **longipes** Loew.
Whole insect yellow ..... female of **humile** Coquillett (?).
17. Cross-veins bordered with brown ..... **pœciloptera** Loew.
Cross-veins not bordered ..... 18.
18. Thorax with five vittæ; hind femora fuscous above ..... **mira** Bigot.
Thorax not vittate; femora not darkened above ..... 19.
19. Abdomen yellow, with rather long yellow pile ..... **pallida** Loew.
Abdomen fuscous, with short black hairs ..... 20.
20. Antennæ yellow basally; thorax opaque ..... **armipes** Loew.
Antennæ black; thorax shining ..... **colonica** Walker.
21. Pile of thorax and at base of abdomen in part pale ..... 22.
Pile wholly black ..... 31.
22. Species of 3 mm. ..... 23.
Larger species of 5–10 mm ..... 25.
23. Stigma dark fuscous; antennæ black ..... **obesa** Loew.
Stigma wanting; antennæ reddish at base ..... 24.
24. Abdomen more or less yellow ..... **compta** Coquillett.
Abdomen wholly black ..... **varipes** Loew.
25. Knob of halteres black; abdomen largely shining ..... 26.
Halteres yellow; abdomen opaque ..... 27.
26. Mesonotal hairs white ..... **comantis** Coquillett.
Mesonotal hairs black ..... **brachystoma** Coquillett.
27. Scutellum with 6 to 8 bristles; antennæ black ..... **ravida** Coquillett.
Scutellum with fewer bristles; antennæ red basally ..... 28.
28. Dorsum of abdomen brown pollinose; scutellum with two bristles; legs of female ciliate, with short black scales ..... **captus** Coquillett.
Scutellum with 4 bristles; legs not feathered ..... 29.
29. Pile of body luteous ..... **Aldrichii** sp. nov.
Pile of body white ..... 30.
30. Stigma brown, wings gray; abdomen blue-gray pollinose.
avida Coquillett.
Stigma wanting, wings whitish; abdomen brown-pollinose.
lævicula Coquillett.
31. Fourth vein incomplete; thorax evittate; eyes of male contiguous (of the known males) ..... 32.

Fourth vein reaching the margin of the wing; thorax almost always conspicuously vittate; eyes of the males separated (as far as known with very few exceptions) ....39.

32. Wings spotted with brown, anterior branch of the third vein perpendicular ....33.

Wings unspotted, first submarginal cell open ....34.

33. First submarginal cell generally closed; fourth vein not forked.
clausa Coquillett.

First submarginal cell open; the shortened fourth vein furcate.
spiloptera Wiedemann.

34. Third antennal joint five times as long as wide, style minute.
triangula Coquillett.

Thirt joint shorter, style comparatively longer....35.

35. Second submarginal cell wider than the first posterior cell...**distans** Loew.

Second submarginal cell subequal in width to the first posterior....36.

36. Wings dark brown....37.

Wings but little infumated....38.

37. Knob of halteres yellowish above; eastern species....**labiata** Loew.

Halteres black, with paler pedicel; Mexican species...**totipennis** Bellardi.

38. Joints of the male front tarsi globose and provided with long hairs.
asema sp. nov.

Joints of the tarsi slender, not long-hairy.
dolorosa Wheeler et Melander.

39. Legs, at least femora, nearly black or wholly black ....40.

Legs, at least in large part, yellowish or reddish ....55.

40. Abdomen wholly black ....41.

Abdomen yellow at the base; legs of female feathered.
pegasus Osten Sacken.

41. Knob of halteres pale....42.

Knob of halteres at least infuscated....49.

42. Eyes of male contiguous; thorax wholly shining....**lævigata** Loew.

Eyes of male separated; thorax vittate ....43.

43. Venter of male with a subapical process; legs simple; thorax and abdomen somewhat shining....44.

Abdomen of male simple; male hind legs with processes; thorax opaque....47.

44. Ventral process of fifth abdominal segment of male with long hairs....45.

Ventral process with short or no hairs ....46.

45. Mesonotum with three shining vittæ; scutellum with four bristles.
pellucida Coquillett.

Mesonotum evittate; scutellum with six or more bristles.
fumida Coquillett.

46. Ventral process with short hairs; central filament hidden.
virgata Coquillett.

Ventral process devoid of bristles; central filament exposed.
infumata Coquillett.

47. Outer process of hind tibiæ of male simple; middle legs not tipped with many spurs....48.

Outer process of male hind knees large, pronged; middle tibiæ tipped by a circle of spurs....**serperastrorum** sp. nov.

48. Abdomen largely shining black ..... **podagra** sp. nov.
Abdomen wholly opaque pollinose ..... **æripes** sp. nov.
49. Wings subhyaline ..... 50.
Wings dark, at least apically ..... 53.
50. Thorax with three gray vittæ; veins strong ..... **cornus** Walker.
Thorax black; veins weak ..... 51.
51. Tarsi black ..... **xochitl** Wheeler et Melander.
Tarsi strongly annulate ..... 52.
52. Front metatarsi enlarged; second antennal joint large, yellow.
atrifemur Wheeler et Melander.
Front metatarsi slender; second antennal joint small, dark.
annulipes Wheeler et Melander.
53. Scutellum with four bristles ..... 54.
Scutellum with about twenty bristles ..... **luctuosa** Kirby.
54. Wings pale at base, reddish apically; filament of hypopygium black at base.
bicolor Bellardi.
Wings dark brown; filament red ..... **montezuma** Wheeler et Melander.
55. Abdomen conspicuously shining ..... 56.
Abdomen pollinose, opaque ..... 62.
56. Scutellum with two bristles; thorax distinctly quadrivittate ..... 57.
Scutellum with four bristles; lateral vittæ indistinct ..... 60.
57. Hind knees simple; hind margin of the abdominal segments narrowly cinereous ..... **nuda** Loew.
Hind knees armed in the male; abdomen without cinereous fasciæ ..... 58.
58. Front tibiæ apically, and front metatarsi wholly brown.
loripedis Coquillett.
Legs almost wholly yellow ..... 59.
59. Humeri yellow ..... **gladiator** sp. nov.
Humeri dusted with cinereous ..... **arthritica** sp. nov.
60. Antennal style one-third as long as the third joint ..... **otiosa** Coquillett.
Antennal style one-half as long as the third joint ..... 61.
61. Eyes of the male contiguous; abdomen of male deep velvet black at the base; abdomen of female shining black ..... **Johnsoni** sp. nov.
Eyes of male separated; abdomen of male shining black over all (female abdomen largely yellow ..... **humile** Coquillett.
62. Abdomen yellow at base ..... **tersa** Coquillett.
Abdomen black or brown above ..... 63.
63. Antennæ short, reddish at base ..... **tenebrosa** Coquillett.
Antennæ black, or with base at most fuscous ..... 64.
64. Halteres black; male legs armed, the inner projection of their hind tibiæ with a terminal spur-like brush; upper hypopygial lamellæ projecting; tips of femora, tibiæ and all of tarsi black; a dense bunch of hair in front of the halteres ..... **valentis** Coquillett.
Without all these characters ..... 65.
65. Anal vein not reaching the margin; legs slender; wings rather long, pure hyaline ..... 66.
All the veins strong, fuscous ..... 67.

66. Male legs with long hairs on outer part; abdomen of male with white pollen. **teres** sp. nov.
Legs not plumose; abdomen dusted with gray..... **aerobatica** sp. nov.
67. Not more than six long scutellar bristles; if otherwise, the thorax has four broad dark brown vittæ .....71.
Generally at least six long scutellar bristles; thorax generally not broadly quadrivittate .....68.
68. Tarsi distinctly annulate..... **annulipes** Wheeler et Melander.
Tarsi uniform in color .....69.
69. Abdomen of male with silvery pollen; legs densely hairy. **cæligena** sp. nov.
Abdomen gray or brown pollinose .....70.
70. Femora largely black, densely hairy but not spinose. **azteca** Wheeler et Melander.
Femora reddish, spinose below ..... **spectabilis** Loew.
71. A long bristle present at the base of the costa ..... **manca** Coquillett.
No long costal bristle present..... .....72.
72. Males.....73.
Females .....86.
73. Legs wholly unarmed, simple .....74.
Armament of legs variously modified.....75.
74. 4 mm.; femora and tibiæ fuscous apically; central filament of hypopygium hidden; wings narrow ..... **stenoptera** Loew.
6 mm.; femora and tibiæ reddish; central filament narrowly visible; wings normal..... **enodis** sp. nov.
75. Hind trochanters with black spines; hind margins of abdominal segments gray .....76.
Hind trochanters unarmed.....77.
76. Hind tibiæ with short bristles ..... **cacuminifer** sp. nov.
Hind tibiæ with moderately long bristles..... **nuda** Loew.
77. Apex of hind femora and base of hind tibiæ merely swollen, but with a few stiff bristles on inner side ..... **nodipes** sp. nov.
Apex of hind femora and base of hind tibiæ provided with strong apophyses .....78.
78. The outer process of the hind tibiæ large, bifurcate. **serperastrorum** sp. nov.
The outer process smaller, not furcate.....79.
79. Abdominal incisures fuscous; posterior tibiæ wholly darkened. **cinerea** Bigot.
Abdominal incisures not differentiated.....80.
80. Inner side of hind femora with an apical longitudinal fringe of black bristles .....81.
Femora with no fringe..... .....83.
81. Scutellum with four bristles..... .....82.
Scutellum with about ten bristles ..... **æripes** sp. nov.
82. Scutellum and parts of body yellow..... **clauda** Coquillett.
Wholly black, gray or brown pollinose..... .....**mixopolia** sp. nov.
83. Legs slender, reddish; fore metatarsi elongate; occiput with but few hairs..85.
Legs short, thickened; front metatarsi short; occiput densely bristly ....84.

84. Third vein furcate beyond the tip of the marginal cell.
dolabraria sp. nov.
Third vein furcate before the tip of the marginal cell.
dolabraria subsp. **disconvenita.**
85. Front metatarsi thickened, black; hind tibiæ shaggy...**canaster** sp. nov.
Front metatarsi slender, red; legs not shaggy.....**falcata** sp. nov.
86. Third antennal joint short and broad; second segment of abdomen with a conspicuous fringe of long black bristles toward the sides; abdomen brownish pollinose.....**gulosa** Coquillett.
Third antennal joint long, slender; abdomen generally gray pollinose....87.
87. Slender species; dusted with whitish; wings narrow; base of the femora and tibiæ paler than the apex.....**stenoptera** Loew.
Of other conformation.....88.
88. Species marked with yellow.....**clanda** Coquillett.
Ground color wholly black.....89.
89. At most three bristles in front of the halteres; antennæ comparatively long..90.
Several bristles in front of the halteres; antennæ shorter.....91.
90. Hind coxæ with conspicuous hairs on their front side....**falcata** sp. nov.
Hind coxæ with but few apical hairs.....**nuda** Loew.
91. Third vein furcate beyond the tip of the marginal cell, the posterior branch ending before the apex of the wing; occiput densely bristly.....92.
Furcation of the third vein opposite or in advance of the tip of the marginal cell, the posterior branch terminating at or beyond the wing tip...94.
92. Large gray-white species devoid of brownish pollen; third vein distinctly arched forward so that the first submarginal cell is narrowed.
arripes sp. nov.
Smaller species, in part brownish pollinose; third vein straight before its furcation.....93.
93. With six scutellar bristles.....**dolabraria** sp. nov.
With four scutellar bristles.....**mixopolia** sp. nov.
94. Legs glaucous; abdominal segments margined with gray posteriorly.
cacuminifer sp. nov.
Legs shining; abdomen unicolorous.....95.
95. Vein between discal and fourth posterior cells much shorter than that between the third and fourth posterior cells.....96.
The two sections equal.....**dolabraria** subsp. **disconvenita.**
96. Species of the Middle States; hind tibiæ straight, rather stout cylindrical; hind femora with numerous thorn-like bristles distally.
enodis sp. nov.
Species of the Western States; hind tibiæ distinctly bent near the knee; bristles of the hind femora longer.....97.
97. Coxæ generally wholly black; abdomen brownish dusted; middle tibiæ fimbriate apically with a few stiff black bristles.
serperastrorum sp. nov.
Coxæ reddish apically; abdomen slaty gray; middle tibiæ not spurred with terminal bristles.....**canaster** sp. nov.

Empis annulipes Wheeler et Melander (Fig. 115).

Biol. Cent. Am., Dipt. Suppl., Nov., 1901, p. 369.

Female.—Black. Front and face dusted with white. Antennæ black; the third

joint largely or wholly reddish yellow, about half as long as the first; third joint tapering, about twice the length of the first two together; style very minute. Proboscis reddish, about as long as the thorax. Thorax rather thickly gray dusted, the dust modifying the ground color; mesonotum with four slender darker stripes; pile and bristles black, the former abundant, erect; humeral and postalar callosities reddish. Scutellum with six bristles Abdomen black, grayish dusted, color very variable in different reflections. Legs reddish yellow; front and hind tibiæ on the distal portion, middle tibiæ at the tip, front metatarsi (except the immediate base, and the tips of all the other tarsal joints dark brown or black; front metatarsi elongate and thickened; all the tibiæ with rather dense hairs on the outer side, but not ciliate. Wings uniformly light yellowish brown; discal cell long. Halteres black, with yellow peduncles. 8-9 mm.

Guerrero, Mexico (Smith).

Empis antifemor Wheeler et Melander (Figs. 116, 117).
Biol. Cent. Am., Dipt. Suppl., 1901, p. 370.

This species, which is closely allied to *E. annulipes*, was established on a single female specimen from Guerrero, Mexico. It differs from *annulipes* thus; antennæ shorter; the second joint comparatively long, of nearly the same size as the first joint; the first and second joints of the antennæ light yellow, but the first joint a little the darker however; style more slender. Proboscis piceous. Mesonotum apparently evittate. Femora black, the anterior ones brownish towards the tip. Front metatarsi shorter and rather thickened. The hairs of the legs are longer and denser, especially on the hind pair.

Empis montezuma Wheeler et Melander (Fig. 114).
Biol. Cent. Am. Dipt. Suppl., Nov., 1901, p. 369.

Male.—Black, opaque, cinerascent. Eyes contiguous on the vertex. Proboscis one and one-half times the length of the head. Antennæ dark fuscous, first joint short, with a few bristles near the apex, third joint wanting. Thorax black, cinerascent, with indications of a median and two side stripes showing black through the coating, sparsely hairy on the disc, densely and strongly so on the humeri and about the scutellum. Pleuræ and pectus concolorous with the mesonotum; abdomen shining in certain lights, velvet-black in others, fuscous on the venter at the base. Halteres black. Hypopygium small, black; lamellæ inerassate, deeply emarginate, with loose dark hairs and small apical teeth; median style densely, finely plumose; penis exposed, reddish. Legs black, the femora and the base of the tibiæ with a reddish tinge; furnished with spines, hairs and pile, the pile long and denser on the middle femora beneath near the base, the middle tibiæ beneath near the tip, the posterior tibiæ on the outer edge, the first and second tarsal joints and the hind metatarsi outwardly; middle femora and tibiæ arched; front metatarsi equal in length to the next two joints (in *E. bicolor* the metatarsi are longer). Wings uniformly dark fuliginous; neuration as in *E. bicolor*. 6.25 mm.

Jalisco, Mexico (Schumann).

Empis bicolor Bellardi (Figs. 112, 113).

Mem. della Reale Accad. d. Scienze di Torino, Ser. 2, vol. xxi, p. 198.

Female.—Black, cinereous. Eyes widely separated; front and face flat, black, cinereous, dorsum of the thorax with two obsolete vittæ, pilose; pile sparse, black, stiff; pleuræ and pectus concolorous with the thorax; halteres black, at the base fuscous. Abdomen depressed, black, cinerascent and black-pilose. Legs wholly jet black, black tomentose, spinose, and pilose, the tomentum, spines and hairs denser and longer on the inner and outer sides, but not arranged as regular cilia. Wings rounded at the apex, uniformly and rather strongly fuliginous, subhyaline at the extreme base, flavescent. 5 mm.

Cuantla, Mexico (Saussure). Numerous specimens. Guerrero.

The male has the middle metatarsus very short, in the female the tarsal joints are slender and gradually decreasing in length. The male differs thus: eyes contiguous above; face more gray, narrower, though its sides are still parallel; hypopygium slightly ascending, not large, the reddish yellow filament rather strongly recurved, black outwardly, and with tip concealed. Bristles on the legs longer and denser, disposed in patches as in *montezuma*. Middle metatarsi but little more than one-half the length of the following joint; wings uniformly clear, with a flavescent tinge, nerves weak.

It may be thought that *E. montezuma* Wheeler et Melander is a variety of this species. It is indeed closely related. Here, also, the middle metatarsi are short, though they are subequal to the next joint, but the dark broader wings and lighter color of the legs and hypopygium distinguish the form from *bicolor*. None of the ten specimens of *bicolor* examined shows any deviation from the opaque jet black of the legs and body. Moreover, the hypopygial filament of *montezuma* is less recurved and wholly reddish; the discal cell of the wings is deeper, while the outer cross vein is strongly bent and perpendicular to the sixth vein; and the submarginal cell is much shorter, more nearly equilateral.

Empis azteca Wheeler et Melander (Fig. 119).

Biol. Cent. Am., Dipt. Suppl., Nov., 1901, p. 369.

Female.—Black. Head thickly grayish-pollinose, the ocellar spot in some reflections showing black. Face shining black below, gray-pollinose below the antennæ. Antennæ black, longer than the head; third joint gently tapering, as long as the first; style minute. Proboscis and labella reddish yellow, black at the base, altogether about as long as the thorax. Thorax opaque gray, variable in color in different reflections; pile erect, black; margin of the scutellum with a row of long hairs. Legs yellow, with black hairs; femora, except the tip, black; last joint of all the tarsi brown or black. Wings uniformly yellowish brown; anterior branch of the third vein very short, rectangular; fourth vein

arched back, distant from the third at the tip; penultimate section of the fifth vein unusually short, not twice the length of the anterior cross-vein; discal cell small. Halteres black, with yellow peduncles. Abdomen thickly gray-pollinose, the second and third segments wholly shining black. Front metatarsi dilated and darker than the second to the fourth tarsal joints. 6 mm.

Guerrero, Mexico (Smith).

Empis pegasus Osten Sacken.

Biol. Cent. Am., Dipt. Suppl., p. 216.

Female.—Black; front moderately broad, opaque; face shining. Antennæ black; third joint not longer than the first, triangular, slightly excised on the underside, the arista as long, or a little longer. Thorax black, with a trace of three grayish stripes. Abdomen with the four basal segments ochraceous yellow, opaque, shining on the incisures only; the last segments black, shining. Legs dark brown or black; femora, tibiæ and tarsi beset with broad fringes of scale-like hairs (on the anterior femora alone the fringes are replaced by hairs); the four hinder femora and the tibiæ distinctly flattened. Wings with a uniform brown tinge; the branch of the third vein slightly oblique. 7 mm.

Volcan de Chirique, Panama, Central America.

Empis xochitl Wheeler et Melander (Fig. 118).

Biol. Cent. Am., Dipt. Suppl., Nov. 1901, p. 370.

Female.—Robust, dull, opaque-black throughout, the only lighter portions being the piceous proboscis, the base of the halteres and the subhyaline wings. Front of uniform moderate breadth. First antennal joint short, second still shorter, the third slightly longer than the other two together; arista forming a continuation of the third joint, stout. Proboscis twice as long as the eye-height. Margin of the first abdominal segment fringed with black bristles, which are stronger laterally. Legs not ciliated, though the longer hairs are serially arranged on the underside of the femora and on the inner and outer sides of the tibiæ; front metatarsi slightly compressed. Wings almost hyaline; no stigmal spot; anterior branch of the third vein obliquely disposed; anal vein attaining the margin. 4 to 5 mm.

Guerrero, Mexico (Smith).

Empis totipennis Bellardi.

Mem. d. Reale Accad. d. Scienze d. Torino, Ser. 2, vol. xxi, p. 199.

Female.—Black cinereous. Antennæ black. Proboscis equal to the head and thorax together. Halteres black, paler towards the base. Legs black-brown; front femora more or less ciliated on the inside; middle and hind femora and all the tibiæ on the inner and outer sides with long, regular cilia; all the tarsi tomentose and spinose, not ciliated. Wings wholly fuliginous, the duskiness darker at the stigma; first submarginal vein arcuate, subsinuose; first posterior vein not reaching the margin of the wing. 5 mm.

Morelia, Mexico (Saussure).

Empis spiloptera Wiedemann.

Empis spiloptera Wiedemann, Auss. Zw., ii, 5, 10.
Empis picta Loew, Cent. iii, 28.

Male.—Head black, occiput cinerascent. Eyes contiguous along the front. Antennæ black, moderate, third joint acuminate, the terminal style rather long. Palpi black. Proboscis badious, exceeding twice the length of the head, labium deeply bipartite. Thorax and scutellum black cinereous, black-pilose. Abdomen dark brown, moderately shining, black-pilose; hypopygium rather large, subglobose, closed, the upper lamellæ short, dark badious, the central filament hidden. Coxæ piceous. Femora pale testaceous, at the very apex spotted with a black dot; the anterior tibiæ testaceous at base, piceous towards apex; hind tibiæ piceous, the base, however, testaceous; tarsi piceous, the very base of each joint testaceous; the whole of the legs clothed with long black hair. Knob of halteres infuscated. Wings pale fuscous, the veins a little more dusky fuscous, the apex of the second longitudinal vein recurved, the anterior branch of the third vein ascending perpendicularly, the fourth vein abbreviated and furcate by an adventitious branch below before the apex; stigma oval, fuscous; the cross-veins, the adventitious branch of the fourth vein, and the costa between the branches of the third vein bordered with fuscous; discal cell broad. 4.2 mm.

Mexico.

Empis clausa Coquillett (Fig. 129).

Proc. Nat. Mus., 1895, p. 401.

Male.—Head black, subshining, eyes contiguous, upper facets larger than the lower ones; antennæ black, the third joint quite short, rather broad at the base; style two-thirds as long as the third joint; proboscis two and one-half to four times as long as the height of the head, palpi brown. Thorax, pleura and scutellum black, opaque, gray pollinose, pile in front of the halteres black; scutellum bearing two bristles. Abdomen black, subshining, towards the base more or less tinged with yellow, its pile black; hypopygium very small, porrect; filament slender, yellow, hidden, except on the basal half. Legs slender, simple, the middle and hind femora and all the tibiæ furnished with much very long black pile; coxæ yellow, the hind ones brown; femora yellow, the hind ones, except at base, blackish; tibiæ and tarsi blackish, extreme base of each tibia yellowish; hind tibiæ greatly dilated towards the tip, bowing inwardly at the middle; front metatarsi nearly twice as thick as the middle ones, hind metatarsi nearly as thick and slightly longer than the front ones. Knob of halteres blackish. Wings hyaline, stigma and a front border to the anterior branch of the third vein and on the small and posterior cross-veins dark brown; veins brown, fourth vein obliterated before reaching the wing margin, anterior branch of the third vein usually ending in the second vein, closing the first submarginal cell; contact of discal and fourth posterior cells much longer than that of the third and fourth posterior cells.

Female.—Differs from the male in that the legs are wholly brown, compressed, and that the upper and under sides of all the femora, outer and inner sides of all the tibiæ, and the upper sides of the front and hind metatarsi ciliate with long, nearly erect scales. Base of abdomen never winged with yellow. 4 mm.

Illinois (Robertson).

This species is common throughout the western part of the United States.

At first reading this may seem to be the same as *E. spiloptera*,

but it is quite different, as Mr. S. W. Henshaw tells me, in the coloration and venation; although these two characters are capable of great variation in this species.

Empis asema sp. nov. (Fig. 130).

Male and Female. Length 4 mm.—Black, gray pollinose, somewhat shining. Head small, occiput gray pollinose, black-bristly; eyes broadly contiguous in the male, and widely separated in the female, facets large above, small below (male), and uniform (female); antennæ moderate, slender, black, first joint rather short, the second joint as long as the first, third joint one and one-half times the length of the first two, broad at the base, suddenly narrowed to mid-way its length, then nearly uniform to the tip, arista three-fourths the length of the third joint; proboscis black, slender, over twice as long as the height of the head; palpi small, slender, black. Thorax shining, sparsely gray-coated, disc with several short black bristles and margined with a few longer ones, scutellum with two apical bristles; pleuræ less shining, and more closely pollinose, the row of black bristles in front of the halteres consisting of about seven. Abdomen subshining, gray pollinose, a little darker than the thoracic notum, rather long and slender, cylindrical in the male, and short, depressed in the female, not conspicuously bristly, its few hairs black; hypopygium closed, subcompressed, small, with several short black hairs, filament yellow, exposed at the base, not thick. Legs short, robust, of the male the coxæ have small bunches of fine black hairs on the anterior side, the femora and tibiæ are regularly ciliate, with long slender black hairs beneath, otherwise hairy, and with a few black slender bristles on the upper side of the middle and hind tibiæ and tarsi; the front metatarsi flattened, broad, nearly as long as the remainder of the tarsus, the next three joints of the front tarsi globose, densely black-bristly, the last joint slender, short, flattened; middle legs slender; hind legs rather stout, the metatarsi stout, three times as thick and one-half again as long as the middle ones. Of the female the coxal hairs, those of the under side of the front femora, of both edges of the other femora and of both edges of all the tibiæ assume a flattened scale-like character, much pronounced on the posterior legs; tarsi slender, hind metatarsi but little thicker than the middle ones. Halteres infuscated. Wings hyaline, distinctly infumated, broad, rounded, basal cells short, the fourth vein not reaching the margin, anterior branch of the third vein slightly curved, obliquely ascending, outer edge of the discal cell deeply angulate, a distinct bristle present at the base of the costa.

One male, three females. May; Austin, Texas.

Empis labiata Loew.

Cent. i, 33.

Male.—Eyes contiguous. Proboscis long, slender; labium very slender, the labellæ filiform, equal to the stipes. Palpi yellow. Antennæ black. Thorax cinerascent with sparse pollen, moderately shining. Hypopygium moderate, porrect, black; the lower lamellæ incurved, with short pubescence and paler towards the apex. Legs black or dark brown, long, slender, with black pile and bristles, all the metatarsi lengthened. Halteres fuscous or blackish, the knob pale above. Wings brownish black, the stigma and veins more dusky; the third

longitudinal vein thick, reaching the margin a little before the extreme apex of the wing, its anterior branch ascending straight to the margin; the fourth vein incomplete.

Female.—The apex of the wing broader than in the male, the third longitudinal vein extending further past the apex of the wing; the discal cell a little larger; the legs with short pile, but the posterior femora and tibiæ with scales on both sides. 3 mm. or larger.

District of Columbia (Osten Sacken).

Empis distans Loew (Fig. 127).

Cent. viii, 54.

Female.—Black. Antennæ black, slender, rather long. Proboscis black, labrum testaceous towards the apex, reaching the middle coxæ, labellæ linear. Thorax blackish gray, opaque, provided with faint black vittæ and sparse black pile; the pile in front of the halteres long, black. Abdomen purer black, shining, with very short black pile. Legs slender, almost black; anterior tibiæ, except the base, and the middle and hind femora on both sides pennate, the middle and hind tibiæ above likewise pennate, below ciliate with ordinary, very short hairs. Halteres dusky yellow, almost fuscous. Wings blackish, the costal and marginal cells darker, veins black; the third longitudinal vein thicker than the others, far distant from the costa, to which it sends an almost perpendicular branch, so that the second submarginal cell forms an equilateral triangle; discal cell rather large; the fourth longitudinal becoming more slender from the base of the discal cell, and slightly reflexed towards the tip. 3.3 mm.

Georgia (Poeppig, Berlin Museum). Numerous specimens from Connecticut and Louisiana.

The male has a small gaping hypopygium which is higher than the abdomen, central filament slender, bowed, the tip concealed, middle lamellæ rather large, the right one terminated by a peculiar downward-hanging membranous appendage, upper lamellæ inflexed. Legs not pennate, but sparsely bristly, the bristles becoming long on the outer edge of the hind tibiæ, middle metatarsi as long as their tibiæ, tarsi not spinose below.

Empis dolorosa Wheeler et Melander (Fig. 128).

Biol. Cent. Am., Dipt. Suppl., Nov., 1901, p. 370.

Male.—Black. Eyes closely contiguous, with an acute angular emargination on each side of the face above. Face shining black. Antennæ black, about as long as the head; second joint more than half the length of the first; third joint longer than the first two together, narrowed on the distal half or more; style slender, about half as long as the third joint. Proboscis black, as long as the head and thorax together. Mesonotum very slightly dusted with white, shining; hair and bristles not abundant, black. Pleuræ whitish-pollinose. Four anterior femora and the middle tibiæ and tarsi luteous-yellow; front tibiæ and tarsi and the hind legs darker brown or blackish; metatarsi not dilated; legs provided with rather sparse hairs. Wings somewhat broad, varying from brown-

ish to hyaline, with an elongated inconspicuous brown stigma; discal cell short; the penultimate section of the fifth vein much shorter than the ultimate section; furcation of the third vein acute; fourth vein abbreviated, not reaching the margin. Knob of halteres black. Abdomen scarcely shining. Hypopygium small, filament yellow, thick, with its tip concealed. 5 mm.

Guerrero, Mexico (Smith).

Empis triangula Coquillett.

Proc. Wash. Acad. Sci., 1901, p. 410.

Black, the halteres and legs dark brown, knees yellow, this color rarely extending over the greater portion of the femora and sometimes of the tibiæ, venter of abdomen of female largely yellow; eyes of male contiguous, third joint of antennæ nearly linear, at least five times as long as broad, the style scarcely perceptible; proboscis from one and one-half to twice as long as height of head; hairs and bristles of thorax and scutellum black; thorax somewhat polished, very thinly gray pruinose, not distinctly vittate, scutellum bearing ten marginal bristles; abdomen slightly polished, hypopygium rather large, obliquely ascending, the lower piece bearing a cluster of rather long, black bristles at its apex, filament hidden, venter of abdomen destitute of processes and of spinous bristles; legs simple, slender, almost bare; wings hyaline, veins and stigma brown, second submarginal cell somewhat triangular, pointed at its base, about one and one-half times as long as broad, discal cell subequal in length to last section of fourth vein, last section of fifth vein half as long as the preceding section. 2-3.5 mm.

British Columbia; Alaska: Tip of Last Vegas Range (Hudsonian Zone), New Mexico (T. D. A. Cockerell).

Empis cornus Walker.

List Dipt. Ins., iii, p. 496.

Black (male), or cinereous (female). Lip, eyes and feelers black; chest of the female adorned with three indistinct hoary stripes; hind borders of the abdominal segments of the female hoary; legs black; knees tawny; shanks and feet piceous; wings colorless, rather broad; wing-ribs and veins piceous, the latter strongly marked; poisers piceous. 4 mm.

Hudson's Bay, St. Martin's Falls, Albany River (Barnston).

A mutilated specimen from Colorado may belong here.

Empis luctuosa Kirby.

Empis luctuosa Kirby, N. A. Zool. Ins., 311, 2.

Empis geniculata Kirby, ibid.

Body entirely black. Proboscis very little longer than the head; wings a little embrowned, with a large black stigma, irridescent, nervures black. Length of body including wings 6 mm.

British America.

E. geniculata Kirby.—Almost black. Wings slightly embrowned, beautifully irridescent; legs, where the shank is united to the thigh, white. Proboscis nearly as long as the thorax. Length 6 mm.

British America.

The synonymy is Mr. Coquillett's, and likewise the introduction of the species into the analytical table is done on Mr. Coquillett's authority for the number of scutellar bristles.

Empis gulosa Coquillett.

Proc. Nat. Mus., 1895, p. 408.

Female.—Head black, bluish gray pollinose; antennæ black, third joint broad at the base, rapidly tapering toward the apex, style slender, more than one-half as long as the third joint; proboscis one-half longer than the height of the head, palpi brown. Thorax black, opaque gray pollinose, marked with four dark brownish vittæ; its very sparse pile black; pleura black, bluish gray pollinose, pile in front of the halteres black; scutellum black, grayish pollinose, bearing four bristles. Abdomen black, opaque brownish pollinose, that on the hind and lateral margins of the segments light gray; on the hind margin of the first three segments toward the sides is a fringe of rather long black bristles, most developed on the second segment. Legs slender, simple, yellow, including the coxæ; tarsi towards the apex brown; femora destitute of long bristles; middle metatarsi slightly thicker, but shorter than the front ones; hind metatarsi much thicker than the middle ones, subequal in length to the front ones. Knob of the halteres yellowish white. Wings grayish, stigma nearly obsolete, veins dark brown, no long bristles on the costa near its base. 7 mm.

Illinois (Robertson).

Empis humile Coquillett.

Proc. Nat. Mus., 1895, p. 403.

Male.—Head black, gray pollinose, except on oral margin; eyes separated a shorter distance than the width of the lower ocellus, facets of a uniform size; antennæ having the two basal joints brownish yellow, the third black, rather narrow, gradually tapering to the tip, style over one-half as long as the third joint; proboscis from two to three times as long as the height of the head, palpi light yellow. Thorax, pleura and scutellum black, opaque grayish pollinose, the rather long pile of thorax and scutellum black; thorax with two blackish vittæ, scutellum bearing four bristles. Abdomen black, shining, the pile rather long and abundant, black; hypopygium large, lamellæ largely yellow, middle ones oblong, slightly tapering to tip, not longer than the broad upper ones; filament slender, almost bristle-like, arcuate. Legs simple, rather robust; coxæ black, femora brownish yellow, lighter yellow at the base, tibiæ and tarsi light yellow, tarsi brownish towards apex; middle and hind legs provided with rather long, stout, black bristles; front and hind metatarsi subequal in size, the middle metatarsi considerably more slender and only two-thirds as long as either of these. Knob of halteres yellow. Wings brownish gray, costal cell and border to some of the veins yellowish; stigma and veins brown.

Female.—Same as the male, with these exceptions: prothorax, the lateral margins of the thorax, the scutellum, metanotum, pleura and abdomen yellowish, a black spot above the middle and hind coxæ, a transverse one on the lower part of the metanotum and sometimes a brownish fascia near or on the hind margin

of each abdominal segment except the first. Coxæ and legs yellow, hind metatarsi much thicker than the front ones. 7 mm.

Illinois (Robertson).

Empis pœciloptera Loew.

Cent. i, 31.

Female.—Yellow, black-pilose. Head yellow. Proboscis yellow, about equal to twice the length of the head. Antennæ long, slender, yellow, the upper margin and the apex of the third joint black. Thorax opaque. Abdomen shining. Legs long, slender, pale yellow, the apex of the tarsi black. Halteres yellow. Wings long, subcinerascent, with a luteous tinge, veins fuscous, the transverse veins bordered with fuscous; the anterior branch of the third vein joined with the second vein by a cross-vein. 4.1 mm.

New York (Edwards).

Empis longipes Loew.

Cent. v, 51.

Male.—Slender, rather bare, yellowish, darker above. Head black, cinereous with whitish pollen. Front very narrow. Antennæ very slender, black, the terminal style moderate. Proboscis about equal to the first two joints of the front tarsi taken together. Thorax lutescent; the dorsum cinereous, opaque, with four narrow fuscous vittæ, the middle ones abbreviated posteriorly, the outer ones much shortened anteriorly, provided with very sparse black bristles and short hair. Scutellum lutescent. Abdomen luteous, shining, with a median vitta on the posterior blackish margins of each segment. Hypopygium moderate, yellow, open, the apex with black hairs, the central filament very thick, concolorous, hidden beyond the base. Legs long, slender, yellow, with short black pile, tarsi piceous, the first joints apically, the others wholly black. Wings yellowish cinereous, veins brownish yellow, stigma concolorous, nearly wanting. 5.5 mm.

New York, Lake George (Osten Sacken).

One female, Alleghany, Pennsylvania, differs from Loew's description of the male as follows:

Basal joints of the antennæ fuscous; the third a little longer than the other two together, its style moderately thick, one-half the length of the third joint; proboscis longer than the hind femora, fulvous on the basal half above; no median vitta on the greatly shining abdominal segments, which are distinctly margined with black posteriorly and laterally; hind trochanters beneath and tip of the femora narrowly black. The outer branch of the third vein is obtusely angulate at its middle, the basal angle of the second submarginal cell being about 70 degrees.

Empis sordida Loew.

Cent. iii, 29.

Male.—Pale tawny, opaque. Head cinereous. Proboscis shorter than twice the length of the head. Basal two joints of the antennæ fuscous, the outer black. Eyes separated. Dorsum of the thorax with four fuscous vittæ, provided with short black pile. Abdomen pale yellow, shining, the base of each segment

fuscous. Hypopygium concolorous, small, clavate, closed, the middle lamellæ ascending, oblong-ovate, with very short pubescence. Coxæ pale testaceous, black pilose. Legs long, slender, testaceous, black pilose; apex of the tibiæ fuscous; anterior tarsi black, except the base; the last joint of the posterior tarsi black. Halteres yellowish. Wings long, subhyaline, cinerascent, faintly tinged with fuscous, stigma obsolete, veins fuscous. 3.5 mm.

District of Columbia (Osten Sacken).

Empis abeirus Walker.

List Dipt. Ins., iii, p. 494.

Male.—Fulvous, hoary. Head hoary, thinly clothed beneath with black hairs; hypostoma black; lip tawny for more than half its length, black thence to the tip, nearly as long as the body; eyes bright red; feelers black; first and second joints dark tawny; chest and breast hoary with a tawny tinge; chest adorned with four gray stripes, between which are rows of short black bristles; the hinder border of the chest is beset with longer black bristles; abdomen black shining; legs tawny, beset with short black hairs and bristles; hips black; feet piceous towards the tips; foot-cushions and claws tawny; wings colorless; wing-ribs and poisers bright tawny; veins piceous, tawny towards the base and along the fore borders. 5 mm.

Georgia (Abbot).

Empis endamidas Walker.

List Dipt. Ins., iii, p. 493.

Male.—Fulvous, head cinereous, narrower than the thorax, clothed with short black hairs; eyes red; mouth tawny, with a black tip, as long as the chest; feelers tawny, black towards their tips, longer than the head; chest paler on each side, beset with short black hairs, adorned on the back with four gray stripes; abdomen fulvous, apically black; legs tawny, clothed with short black hairs; hips and trochanters gray; knees black; tips of the feet piceous; a short black stripe on each of the four front thighs; wings nearly colorless, tawny towards the base. 6 mm.

Empis amytis Walker.

List Dipt. Ins., iii, p. 493.

Male.—Fulvous. Head black, much narrower than the chest; eyes dark red; mouth tawny, with a black tip, much shorter than the chest; feelers black; chest and breast tawny; disc of the former black; abdomen black, dull, tawny along each side; legs tawny, clothed with short black hairs; knees and tips of feet black; wings colorless; wing-ribs and poisers tawny; veins piceous, tawny towards the base. 5 mm.

New York.

Empis ollius Walker.

List Dipt. Ins., iii, p. 493.

Female.—Fulvous. Head gray, thinly coated beneath with black hairs; hypostoma black, shining; lip dark tawny, piceous at the tip, shorter than the body; eyes bright red; feelers black; chest and breast dull tawny; chest adorned with four brown stripes, between which are rows of short black bristles; the hinder

part of the chest is beset with longer black bristles; abdomen black, shining, legs tawny, beset with short black hairs and bristles; hips black; feet piceous towards the tips; wings slightly tawny; wing ribs and poisers bright tawny; veins piceous, tawny towards the base and along the fore borders. 4 mm.

Nova Scotia.

Empis lauiventris Escholtz.

Wiedemann, Aussereurop. Zweifl. Ins., 2, p. 6.

Fuscous; head black; thorax in front and abdomen with yellow hair. Head below wholly bare; occiput with long black hairs. Eyes brown. Antennæ black, the first two joints with hairs at their tips only. Proboscis black; palpi yellow. Thorax grayish brown, with brown hairs on the dorsum, on the pleuræ with longer yellow hairs. Scutellum grayish brown, with a few black bristles. Pectus grayish brown, with no hairs. Abdomen above dark brown, with fine black pubescence; venter in the middle and plainly on the sides with long, dense yellow hairs. Wings much longer than the body, somewhat yellowish, with brown veins, those nearest the costa wholly yellow; the anterior branch of the third vein strongly arcuate. Knob of the halteres yellow, the pedicel brown. Legs reddish brown, with piceous tarsi, with fine black hairs; hind tibiæ bowed; femora scarcely thicker than the tibiæ. 8 mm.

Alaska. Bering Isl.

Empis colonica Walker.

List Dipt. Ins., iii, p. 498.

Body bright tawny, shining, smooth, beset with a few slender short black bristles; eyes and feelers black; lip tawny piceous towards the tip, much more than half the length of the body; abdomen dark tawny, thinly clothed with short black hairs and bristles; feet piceous towards the tips; wings with a tawny tinge; wing-ribs tawny; veins brown, tawny towards the base; poisers pale yellow. 6 mm.

Nova Scotia (Redman).

Empis leptogastra Loew.

Cent. iii, 30.

Female.—Slender, yellow, shining, rather bare. Head black, face and front very narrow, concolorous; antennæ slender, elongate, the third joint black, the preceding fuscous. Proboscis slightly longer than the head, slender, yellow. Dorsum of the thorax divided by a longitudinal black median vitta. Abdomen marked with a basal black fascia on each segment, united by a black line, the last segment black altogether. Legs with sparse fine pile, slender, the hind femora thickened towards the apex and bearing black spines below; the apex and a median ring of the hind femora, the apical third of the hind tibiæ and all the tarsi black. Knob of the halteres infuscated. Wings rather long and narrow, cinereous hyaline, veins piceous, the third vein slightly incurved apically, the anterior branch ascending perpendicularly. 4.5 mm.

District of Columbia (Osten Sacken).

Empis armipes Loew.

Cent. i, 32.

Male.—Yellow, with short black pile. Eyes distant. Proboscis yellow, longer

than the head. Palpi yellow. First two joints of the antennæ yellowish brown, the third joint black, long, strongly attenuate from the broad base, the terminal style long. Thorax opaque, a single fuscous vitta, abbreviated from each side and sometimes obsolete. Abdomen shining, fuscous, the side and hind margins of each segment yellow. Venter yellow. Hypopygium small, porrect, the middle and lower lamellæ yellow; the central filament almost concealed. Legs long, slender, yellow, the tarsi from the apex of the first joint almost black; the posterior legs with the femora armed with some very obtuse spines, a part large and black-pilose, the others smaller and bare. Halteres yellow. Wings long, brownish gray, the faint stigma a little more brown, veins fuscous.

Female.—Very much like the male; the posterior legs simple; the pile of the tibiæ and tarsi shorter and sparser than in the male. 5 mm.

New York.

Empis tridentata Coquillett (Fig. 132).

Proc. U. S. Nat. Mus., vol. xxiii, p. 609.

Head black, gray pruinose, front of male at narrowest point less than the width of the lowest ocellus; antennæ black, the first two joints yellow, the third slightly over four times as long as wide, gradually tapering to the apex, nearly four times as long as the style, palpi and proboscis yellow, the latter almost twice as long as the height of the head; thorax yellow, a large black, gray pruinose spot in the middle of the hind part of the mesonotum; sending three prongs toward the head, the median one subopaque, the lateral ones polished, three small black spots beneath the insertion of each wing, and a fourth bordering the mesothoracic spiracle and prolonged backward almost to the wing, hairs and bristles of thorax black, scutellum yellow, the base of the middle black, bearing four bristles; abdomen polished, yellow, bases of segments two to four or five usually black, most extended in the female, central filament of male hypopygium very sinuose; legs yellow, apices of tarsi brown, middle and hind femora beset with spinous bristles on the under side; wings hyaline, stigma brown, a brown cloud on the base of upper branch of third vein, another on vein at base of second posterior cell, and one above forking of second and third veins. 6 mm.

Pennsylvania (C. W. Johnson).

Empis pallida Loew.

Cent. i, 30.

Male.—Wholly yellow. Head concolorous. Eyes separated. Proboscis much longer than the head. Antennæ long, slender, first two joints yellow, third, except the base, black, with a slender terminal style. Thorax opaque, sparsely black-pilose. Abdomen shining, covered with rather long yellowish pile. Hypopygium small, clavate, the median lamellæ oblong-ovate, ascending, with short pile. Coxæ yellow, with black pile. Legs long, slender, yellow, with black pile; last joint of the tarsi wholly, the others apically black. Halteres yellow. Wings large, hyaline, pale cinerascent, with a yellowish tinge, stigma pale yellow, almost wanting, veins yellow. 4 mm.

New York (Edwards).

Empis rufescens Loew (Fig. 120).

Cent. v, 52.

Male.—Yellow, reddish above. Thorax subopaque, abdomen shining. Head black, cinereous with whitish pollen. Eyes narrowly separated on the front. Antennæ moderate, rather stout, the first two joints red, the third black, the terminal style moderate. Proboscis yellow, longer than the front tibiæ. Dorsum of the thorax provided with a few black hairs and bristles. Hypopygium yellow, rather long, ascending, closed, the lower lamellæ long, the upper small, short-ovate, the central filament exserted, low, slender, curved, yellow. Legs slender, clothed with short black hairs and setulæ, yellow, the first two tarsal joints apically and the other three wholly black. Wings cinereous with a yellowish tinge, veins fuscous, becoming luteous towards the costa and base, stigma very pale, subfuscous. 6.1 mm.

New Hampshire (Osten Sacken). Massachusetts (Hough).

Empis rubida Wheeler et Melander (Fig. 121).

Biol. Cent. Am., Dipt. Suppl., p. 368, Nov., 1901.

Female.—Front and face shining black. Antennæ reddish yellow; third joint slender on the distal part, the style slender, aristiform. Proboscis yellow, not longer than the head. Mesonotum shining, yellowish red, strongly convex; bare; pleuræ yellower. Abdomen brownish yellow. Legs light yellow, not dilated or ciliated; tip of all the metatarsi and the remaining tarsal joints, the tips of the hind femora and tibiæ blackish. Wings cinereous hyaline, with yellowish veins; stigma elongate, brown; anterior branch of the third vein nearly rectangular and gently arcuated. Halteres yellow. 4 mm.

Guerrero, Mexico (Smith).

Empis otiosa Coquillett (Fig. 122).

Proc. Nat. Mus., 1895, p. 407.

Male.—Head black, gray pollinose, eyes separated as widely as the posterior ocelli, facets of a uniform size; antennæ black, third joint two and one-half times as long as the first, rather narrow, style one-third as long as the third joint; proboscis two and one-half times as long as the height of the head, palpi yellow. Thorax black, opaque gray pollinose, marked with two darker vittæ, its sparse pile and bristles black; pleura black, gray pollinose, its pile black; scutellum gray pollinose, bearing four bristles. Abdomen black, depressed, except towards apex, subshining, its pile rather abundant and long, black; hypopygium rather small, middle lamella longer than the upper, rounded on the lower side; filament rather slender, yellow. Legs simple, very robust, femora nearly twice as thick as their tibiæ, hind femora one-third longer than the middle ones; coxæ black, femora dark brown, yellowish at base and apex, the hind ones sometimes wholly yellowish, tibiæ and tarsi light yellow, apex of the latter brown; front metatarsi unusually large, nearly twice as long and as thick as the middle ones, one-half thicker and one-third longer than the hind ones. Knob of halteres light yellow. Wings hyaline, stigma pale brownish, veins dark brown.

Female.—Same as the male, except that the tibiæ and tarsi are darker, the yellow being replaced with reddish; the femora are usually reddish and are more slender; the hind ones are nearly twice as long as the middle ones; front meta-

tarsi more slender and one-half longer than the middle ones, also more slender and slightly longer than the hind ones; wings grayish brown. 6–7 mm.

Illinois, Connecticut; Massachusetts, New Hampshire, Kansas, Louisiana.

Empis Johnsoni sp. nov. (Fig. 123).

Male and Female. Length 6 mm.—Black, head and thorax closely covered with grayish tomentum, the gray color with a slight brown tinge. Eyes maroon color, of the male contiguous for two-thirds the distance between the front ocellus and the antennæ; of the female the eyes are separated more widely than the posterior ocelli; face short, broad, cinereous-dusted, oral border shining black, cheeks obliterated, mouth-opening large; palpi short, extending straight forward, but not surpassing the oral border, luteous, with a slender black subapical bristle; proboscis slender, extending to the tip of the middle coxæ, yellow above, black below; antennæ shorter than the head-height (male), or subequal to it (female), first two joints short, fuscous, the third elongate, lanceolate, black, blunt at the tip in the female, the arista one-half the length of the third joint in the male, or more slender and only one-third the length in the female; occiput cinereous, its black bristles in two rows, moderately bristly below. Thorax cinereous, dorsum with two narrow darker stripes, and two broader posteriorly placed lateral ones; between the median and lateral vittæ a distinct series of black bristles, humeri with a bunch of hairs, dorsum margined with about eight prominent macrochætæ on each side, scutellum with four long marginal, and no short bristles, the row in front of the halteres dense, with about fifteen bristles, no other pleural bristles, pectus with a few scattered short bristles. Abdomen depressed, shining, very faintly cinereous toward the base in the female and opaque jet black in the male on the basal four segments, which are rather densely provided with long black marginal hairs; hypopygium shining, compressed, rather large, distinct, porrect, central filament yellow, slender, arcuate, largely visible, middle lamellæ large, pointed, porrect, fulvous on the lower side, upper lamellæ small, bipartite, fulvous, except the darkened upper edge. Coxæ black, faintly slaty-gray pollinose, with numerous black bristles, remainder of the legs fuscous, becoming darker on the outer half of the tarsi; legs slender, unarmed, hind femora below with evident spines, legs with numerous bristles and short black hairs; pulvilli and claws of male large. Halteres fuscous. Wings subhyaline, with a brownish tinge, stigma almost obsolete, veins strong brown, third vein furcate beyond the tip of the marginal cell, the anterior branch arises acutely, the posterior branch terminates just before the extreme wing-tip, first submarginal cell narrower than the first posterior cell, sixth vein recurved at the tip, costa with a strong bristle at its base.

Four specimens; Montgomery County, Pennsylvania (C. W. Johnson).

Empis enodis sp. nov. (Fig. 125).

Male and Female. Length 6–8 mm.—Almost bare species of moderate stature. Black, cinerascent with olivaceous gray. Head cinerascent, eyes wine color, separated at their narrowest part in the male as widely as the posterior ocelli, in the female a trifle more; palpi very small, reddish; proboscis once and one-half

to two times the height of the head, black above, reddish below, labella black; antennæ black, slender, as long as the head, second joint one-half the length of the first, first and second joints with sparse hairs, third joint lanceolate, somewhat blunt in the female, arista one-third the length of the third joint; the strong bristles of the occiput in two rows. Thorax brownish gray cinereous, the brown more evident on the dorsum, with four broad brown vittæ, the intervittal spaces with short hairs, those of the median series minute, a few long marginal macrochætæ on the dorsum; scutellum with four to six marginal bristles of uneven length, the central pair longest; metapleural row consisting of about five closely-placed nearly uniform bristles; prothoracic series small, no pectal or other pleural bristles. Abdomen concolorous with the pleuræ, devoid of long hairs, almost glabrous, except towards the tip, with strong bristles near the incisures; hypopygium small, not extending above the abdomen, closed, central filament hidden, or sometimes the trumpet-shaped tip more or less exposed, middle lamellæ small, rounded, fulvous, upper lamellæ small, nearly hidden. Coxæ cinerascent, apically more or less fuscous, provided with a few bristles, those of middle and hind legs in series, trochanters with a minute black spot; legs simple, fuscous, femora narrowly tipped with black, tarsi black, legs with small bristles, becoming short and dense on the hind tibiæ of the male, and on the under side of all the tarsi of both sexes, and long on the tibiæ, sparsely so on the front and middle ones, and more numerous on the hind ones of the male; none of the metatarsi or tibiæ thickened; pulvilli minute. Halteres reddish. Wings hyaline, with a smoky tinge, no stigmal spot; veins strong, dark fuscous, discal cell rather deep, the first section of its anterior border one-fourth the length of the second section; the furcation of the third vein even with the tip of the marginal cell, the posterior branch terminates beyond the tip of the wing.

Glen Ellyn and Chicago, Illinois.

Empis stenoptera Loew.

Cent. v, 50.

Slender, almost glabrous, opaque, whitish cinerascent, abdomen of female less whitish. Head concolorous. Eyes of the male separated. Antennæ very slender, black. Proboscis black, longer than the head, but shorter than the anterior femora. Dorsum of the thorax quadrivittate with subfuscous, the median vittæ abbreviated posteriorly, the outer anteriorly. Hypopygium of the male closed, black, the lower lamellæ testaceous, the central filament hidden. Coxæ whitish cinerascent, pale yellowish apically. Legs slender, fuscous, the base of the femora, and the base of the tibiæ broadly below, yellow, the tibiæ towards the tip and all the tarsi black. Halteres pale yellowish. Wings narrow, cinereo-hyaline, stigma obsolete, veins fuscous. 4 mm.

New Hampshire (Osten Sacken).

Empis cacuminifer sp. nov. (Fig. 124).

Male and Female. Length 6 mm.—Dusky opaque species. Head, pleuræ, metanotum and large part of the abdomen dark plumbeous gray-pollinose; thoracic dorsum broadly quadrivittate with brown. Palpi fuscous, without hairs; proboscis one and one-half times the head-height or less, dark reddish, the labella shorter than the proboscis. Antennæ as long as the head, slender, black, the first joint twice as long as the second, the third joint not quite three times

the length of the first, lanceolate, its arista one-third its length; eyes separated a little more widely than the posterior ocelli in the male, and a little more in the female; bristles of the occiput irregularly placed. The intervittal bristles of the thorax minute, the marginal macrochætæ short, no long humeral macrochæta; scutellum with two long and two short marginal bristles; three or four bristles in the vertical row in front of the halteres; bristles of the pronotal collar minute, no pectal bristles present. Abdomen dull grayish, with a piceous tinge, wholly opaque, the hind margins of the segments cinereous; hypopygium moderate in size, closed, central filament rather stout, nearly straight on the exposed basal part, fuscous, shining, middle lamellæ concealing the remainder of the hypopygium, dark fuscous. Legs stout, dark fuscous, including the coxæ, tarsi blackish; coxæ sparsely black-bristly, more evidently bristly in front; tip of trochanter and of femora narrowly black; hind femora slightly bowed on the proximal third; hind trochanters of the male widened within and produced as a prominent tubercle, which is capped by a dense pencil of black bristles, remainder of the legs without sexual armament; hind femora not reaching the end of the abdomen, as long as or shorter than their tibiæ; front metatarsi of the male a little stouter than those of the female, tarsi densely spinose beneath; bristles of the legs prominent, especially in the male, pubescence not marked. Halteres reddish yellow. Wings hyaline, with a faint brown tinge, veins fuscous, stigma obsolete, third vein furcate opposite the end of the marginal cell, the posterior branch terminates at the wing apex; discal cell moderate, the first section of its fore margin one-fifth the length of the second section, no prominent costal bristle.

Numerous specimens from Ohio (J. S. Hine), and Alabama (C. F. Baker).

Empis nuda Loew (Fig. 126).

Cent. ii, 20.

Male.—Pale cinereous, opaque, almost glabrous. Eyes distant. Antennæ elongate, slender, black. Proboscis moderate. Thoracic dorsum almost bare, with very sparse black bristles and four fuscous vittæ, the middle vittæ abbreviated posteriorly, the outer on both sides. Pleuræ cinereous, bare, except for two black bristles in front of the halteres. Abdomen fusco-cinereous, the hind margins of each segment grayish white. Hypopygium small, yellowish, with sparse black pile, the lamellæ oblong-ovate, the base of the central filament very thick, the apex hidden. Coxæ pale yellow, the anterior bare, except for a few apical setæ. Legs slender, darker yellow; the tarsi and a very narrow apical ring on the hind femora almost black, the base of the tarsi and the apex of the tibiæ paler fuscous; the hind trochanters armed with small black spines below; the black pile of the femora very short, of the middle tibiæ longer, of the hind tibiæ long above. Wings cinerascent, the obsolete stigma pale subfuscous, veins strong fuscous. 6 mm.

Illinois (Le Baron).

The following remarks, based on further specimens also from Illinois, may be of service in the identification of this species.

Eyes separted in the case of the male as widely as the width of the anterior ocellus. The occipital bristles short, arranged in two

rows. All the intervittal spaces provided with sparse minute bristles arranged longitudinally. The row in front of the halteres consists most generally of three bristles. Scutellum with two bristles. The abdomen is slightly shining through the sparse coating. The hind femora possess a single short spine-like bristle at the beginning of the outer third of the lower surface; front metatarsi as thick as the outer part of the tibia, and nearly as long as the three following joints. Halteres pale yellow. Stigma wanting, the third vein acutely branched at the tip of the marginal cell, its anterior branch scarcely two thirds the length of the posterior branch, which ends at the extreme wing tip; the proximal section of the vein bounding the discal cell anteriorly scarcely one third the length of the second section.

The female differs from the male in that the eyes are separated a little more widely, the posterior trochanters lack the pencil and are not explanate, the hairs of the legs are all short and evidently bristle-like, and the front metatarsi are slender.

Empis compta Coquillett.

Proc. Nat. Mus., 1895, p. 405.

Female.—Head black, gray pollinose; two basal joints of antennæ brown, the third black, narrow, elongate, style one-sixth as long as the third joint; proboscis over twice as long as the height of the head, palpi brown. Thorax and pleura black, opaque gray pollinose, thorax marked with four blackish brown vittæ; pile in front of halteres black; scutellum blackish, its apex brown, bearing four bristles. Abdomen on base of segments yellowish brown, on apex broadly yellow, seventh and eighth segments and the two anal lamellæ wholly brown; pile of abdomen sparse, yellowish, no fringe of long black bristles on the hind margin of any of the segments. Legs slender, destitute of a fringe of scales, yellow, including the coxæ; tarsi toward the apex brown; metatarsi of nearly an equal thickness, the hind ones slightly longer than the others. Knob of halteres light yellow Wings hyaline, stigma wanting, veins light brown, no stout bristle on costa near its base (first marginal cell closed in one wing, broadly open in the other). 3.5 mm.

Illinois (Robertson).

Male.—Beyond the fifth abdominal segment the abdomen is suddenly bent downward, the seventh dorsal segment convex, small; hypopygium moderately large, hanging downward, almost cylindrical, tubular, the lamellæ porrect, moderately prominent, yellowish, the central filament reddish, hidden within the tube. Legs slender, unarmed, the hind femora beneath and the tibiæ outwardly with a few slender, black longer hairs. Wings slender, rather pointed, the first submarginal cell open, the anterior branch of the third vein bent, extending acutely.

Opelousas, Louisiana, March.

Empis varipes Loew.

Cent. i, 34.

Male and Female.—Hunch-backed. Head, thorax and scutellum cinereous, opaque. Proboscis longer than the head, luteous, stripes of the labium black. First two joints of the antennæ dark brown, the third black. Thorax black-pilose. Abdomen black, very shining, sparsely provided with very fine pale pile, the base and venter luteous. Hypopygium of the male very small, dipping down, black, the central filament low and slightly curved. Front coxæ luteous, the others grayish brown. Legs luteous, a very broad subapical ring on the posterior femora black, a very broad subbasal ring on the hind tibiæ fuscous, sometimes wanting, the apex of all the tibiæ fuscous; all the femora below with small black spines. Halteres white. Wings of the male longer than those of the female, whitish, veins concolorous, but the second section of the costa and the apex of the third longitudinal blackish; wings of the female pure hyaline, not whitish, with a very faint cinerascent tint, veins fuscous. 3 mm.

Pennsylvania (Osten Sacken).

Empis levicula Coquillett.

Proc. Nat. Mus., 1895, p. 406.

Male. Head black, bluish gray pollinose, eyes contiguous; antennæ black, the two basal joints yellow, style over one-half as long as the third joint; proboscis yellowish, black at the apex, over three times as long as the height of the head, palpi yellow. Thorax, pleura and scutellum black, opaque gray pollinose; thorax with four brown vittæ, its sparse pile and bristles black; pile of pleura white, scutellum bearing four bristles, the two outer very short. Abdomen black, opaque brown pollinose, its sparse pile white; hypopygium small, the filament hidden. Legs slender, destitute of long bristles, dark yellowish, including the coxæ; the tarsi toward the apex black; front metatarsi nearly as long, but only about half as thick as the hind ones. Wings whitish hyaline, veins brownish, stigma wanting. Halteres yellow.

Female.—Same as the male, except that the thorax and abdomen are wholly bluish white pollinose. 6-7 mm.

Illinois (Robertson).

Empis avida Coquillett.

Proc. Nat. Mus., 1895, p. 405.

Female.—Head black, bluish gray pollinose; antennæ brown on the two basal joints, the third joint black, short, broad, tapering gradually to the tip, style over one-half as long as the third joint; proboscis three times as long as the height of the head, palpi yellow. Thorax, pleura and scutellum black, opaque, bluish gray pollinose; thorax marked with four blackish brown vittæ, its pile rather dense, but quite short, black; pile in front of halteres white, abundant, fine; scutellum bearing four bristles. Abdomen black, opaque, light bluish gray pollinose, its pile white, that on sides near the base abundant, long; no fringe of long black bristles near the hind margins of any of the segments. Legs slender, simple, femora destitute of long bristles; coxæ brownish yellow, the hind ones largely blackish; femora, tibiæ and tarsi brownish yellow, apices of tarsal joints and last joint wholly blackish; middle metatarsi scarcely thicker than the front ones,

hind metatarsi nearly twice as thick but scarcely longer than the front ones. Knob of halteres yellowish white. Wings grayish hyaline, stigma and veins dark brown, no long bristle on costa near its base. 7 mm.

Illinois (Robertson).

Empis comantis Coquillett.

Proc. Nat. Mus., 1895, p. 402.

Male.—Black; apex of palpi, proboscis, except the base and the lower lip, femora, except a large portion of the under side, tibiæ and tarsi, except at apex, yellowish red. First antennal joint twice as long as the second; the third one and one-half times as long as the first; style slender, as long as the third joint; frontal triangle naked; eyes narrowly separated; proboscis three times as long as the height of the head. Thorax opaque gray pollinose, marked with four blackish vittæ, thickly white and black pilose, the bristles black; pile at each end of pleura, on coxæ and abdomen mixed black and white; that on venter and sides of abdomen abundant, white. Scutellum white pollinose, and bearing twelve marginal black bristles. Abdomen shining, nearly destitute of pollen; hypopygium large, ascending; central filament largely yellow, double, free, arcuate. Legs simple, femora thickened, the hind ones over twice as thick as their tibiæ; pile and bristles of femora rather numerous and long. Wings slightly brownish, stigma and a spot above base of second vein, dark brown, anterior branch of third vein very oblique and much curved. 9 mm.

Northern California (O. T. Baron).

The knobs of the halteres are black.

Empis brachysoma Coquillett.

Proc. Wash. Acad., 1901, p. 409.

Black, the palpi, horny portion of proboscis, stems of halteres, femora and tibiæ yellow, front and hind femora in both sexes and hind tibiæ in the male, yellowish brown, coxæ brown basally, changing into yellow at their apices, tarsi and knobs of halteres dark brown, apex of male abdomen marked with yellow; eyes of male contiguous, third joint of antennæ rather broad at base, quite rapidly tapering to the apex, about twice as long as the style, proboscis twice as long as height of head; hairs and bristles of mesonotum black, hairs of pleura and abdomen white; thorax opaque, gray pruinose, mesonotum marked with four slightly polished, black vittæ, scutellum bearing from four to six black bristles; abdomen of male polished black in middle of dorsum, the sides opaque, gray pruinose; in the female the dorsum of segments two to four, and all of abdomen beyond fifth segment polished black, remainder of abdomen opaque, gray pruinose; hypopygium of male rather small, obliquely ascending, claspers destitute of processes, dorsal piece with a broad emargination in the posterior end almost reaching its center, central filament hidden, venter destitute of processes and of spinous bristles; legs of male simple, femora destitute of bristles and long hairs; first joint of hind tarsi noticeably thicker than that of the front ones; legs of female ciliate with nearly erect scales on both sides of the hind femora and tibiæ, middle femora, and apical half of upper side of the front femora; wings unusually long and narrow, grayish hyaline, stigma and veins, except at base of wing, dark brown, venation normal. 7 mm.

Alaska.

Empis obesa Loew.

Cent. i, 28.

Male.—Cinereous, opaque. Eyes contiguous. Proboscis slender, nearly equal to the body. Palpi yellow. Antennæ black. Dorsum of the thorax with four black vittæ covered with fine whitish hairs and a little longer black pile. Margin of the scutellum with black bristles. Abdomen white-pilose. Hypopygium large, swollen, ascending; lamellæ obtuse at apex, the upper wholly badious; the central filament high and very thick. Coxæ cinereous, badious at the very tip, clothed with pale hairs and a few black bristles. Legs slender, simple, badious, black-pilose; anterior tibiæ apically and the posterior all but the base dark brown; tarsi black. Halteres luteous. Wings infuscated, veins and stigma dark fuscous, the discal cell moderate, the anterior branch of the third vein very oblique. 3 mm.

Massachusetts (Scudder).

Empis Aldrichii sp. nov. (Fig. 110).

Male. Length 7.5 mm.—Head and thorax black, gray pollinose, abdomen fulvous or partly black. Front and face gray pollinose; eyes separated as widely as the width of the anterior ocellus, facets small, of uniform size; face of even breadth, sides of the front rounded inwardly, anterior oral margin black, shining; occiput gray pollinose, black-bristly above, the bristles arranged as a postocular row and scattered beyond this, with fine hairs intermixed; on the lower occiput the hairs are white; proboscis three times the length of the head, fulvous, the labella black; palpi ribbon-like, pale lemon-yellow, rectangularly bent at their middle; antennæ as long as the face and front together, slender, the first two joints yellowish, the third black, the second joint one-half the length of the first, the third joint as long as the first and second united, gradually acuminate, with a rather slender style one-third its length; not conspicuously hairy. Thorax gray pollinose, the pollen without any bluish tinge, but merging towards olive-brown instead; tip of the humeral callosity red, shining, subhumeral spiracle large, yellow; on the middle of the pectus above each of the front coxæ is a conspicuous rosette of yellowish hairs, in front of the halteres is a row of many fine yellowish hairs; dorsum of the thorax opaque brown-gray pollinose, provided with four chocolate-brown broad vittæ, the middle pair abbreviated posteriorly on the concave portion of the mesonotum, the outer pair abbreviated anteriorly; humeri with a few short blackish bristles, sparser on the notum, intervittal spaces provided with scattered short, fine yellowish hairs, the margin of the notum with several black bristles, scutellum with four marginal bristles, an extra pair of small ones present rarely; the intervittal black bristles become longer in front of the scutellum. Abdomen robust, as long as the head and thorax united, cylindrical, not shining (or at least but little shining on the rubbed parts), closely covered with pollen, gray basally, becoming fulvous on the remainder of the abdomen, the segments rather conspicuously provided with luteous hairs; the ground color of the abdomen is piceous, with the posterior margins of the segments flavescent, the last ventral segment larger, black, dusted or not, provided with a few apical black spurs on the right side; hypopygium robust, more or less spherical, yellowish red, its parts distinct, the filament curved, stout, partly clasped near its middle by the inferior triangular lamellæ. Legs moderate, sim-

ple, reddish yellow; coxæ grayish basally, with whitish hairs on the antero-exterior side, trochanters with a faint blackish spot below near the tip; femora a little thickened; metatarsi about equal in thickness, slender, front and hind ones of the same length, middle ones a little shorter; last tarsal joint blackish; legs clothed with very fine, dense, short, pale pubescence and with short blackish hairs, longer on the under edge of the femora. Halteres large, yellowish. Wings large, full, dark, no stigma present, anterior branch of the third vein curved, oblique, no large costal bristle.

Two males; Moscow, Idaho, and Mt. Hood, Oregon.

This species differs structurally from *E. ravida* Coquillett in the larger hypopygium, thickened femora, slender tibiæ and tarsi, separation of the eyes, and the chætotaxy, especially of the scutellum, hind femora and coxæ.

Empis ravida Coquillett (Fig. 111).

Proc. Nat. Mus., 1895, p. 403.

Male.—Black, the palpi and halteres yellow, the proboscis, except the lower lip, hypopygium, coxæ (largely or wholly), femora, tibiæ and tarsi, reddish yellow. Eyes contiguous, frontal triangle bare. First antennal joint two and one-half times as long as the second, the third joint one and a half times as long as the first, sublanceolate, the style rather slender, nearly half as long as the third joint. Proboscis twice as long as the height of the head. Thorax opaque, gray pollinose, marked with four brownish black vittæ, the shorter pile whitish, the longer pile and the bristles black. Pile on each end of the pleura, on coxæ, venter and sides of abdomen whitish; middle and hind coxæ bearing black bristles. Scutellum bearing six to eight black bristles. Abdomen opaque, white pollinose, the short pile of the dorsum black. Hypopygium moderately large, obliquely ascending, the central filament not disengaged; no projections on venter in front of the hypopygium; coxæ and legs simple, femora destitute of stout spines below, the bristles very short; wings dark gray, stigma much elongated, dark brown, anterior branch of the third vein oblique and curved.

Female.—Same as the male with these exceptions: eyes widely separated; abdominal segments beyond the fifth shining; apical half of the under side of the hind femora ciliate with rather short scales and spines. 6–8 mm.

New Hampshire (Coquillett); Georgia, Idaho.

Empis captus Coquillett.

Proc. Nat. Mus., 1895, p. 405.

Male.—Differs from the male of *Empis ravida* only as follows: first two antennal joints reddish; first joint only slightly longer than the second, the third three times as long as the first, tapering very gradually to the apex; scutellum bearing only two bristles; dorsum of abdomen brownish pollinose. Hypopygium very large, the filament robust, disengaged, arcuate, compressed and dilated near the apex; on base of upper side of each upper lamella is a low wart-like process, and just outside of this is a backwardly projecting fleshy process bearing on the middle of its under side a backwardly directed black spine whose tip is even with

that of the process from which it springs; below this process is a second, yellow fleshy, upwardly directed process. Wings hyaline.

Female.—Differs from the male in that the proboscis varies from two to four times the head-height; femora and tibiæ of middle and hind legs ciliate on each side with rather short, black scales and bristles, the scales sparsest on the middle tibiæ. 5-7 mm.

North Carolina and Georgia.

Empis tersa Coquillett.

Proc. Nat. Mus., 1895, p. 404.

Male.—Differs from the male of *Empis ravida* only as follows: abdomen shining reddish yellow; coxæ, femora and tibiæ lighter yellowish; first antennal joint twice as long as the second, the third joint twice as long as the first; proboscis three times as long as the height of the head; thorax destitute of whitish pile, that on each side of the pleura black, each coxa bearing several black bristles; pile and long bristles of abdomen and venter wholly black. Scutellum bearing four bristles. Abdomen shining, destitute of pollen. Hypopygium small, porrect; the central filament free, filiform, arcuate. Bristles of middle and hind femora rather long.

Female.—Differs from the male in that the proboscis is six times as long as the height of the head, when bent backward almost reaching the tip of the abdomen. 6 mm.

North Carolina.

Empis tenebrosa Coquillett.

Proc. Nat. Mus., 1895, p. 404.

Male.—Differs from the female of *Empis ravida* only as follows: eyes as widely separated as the posterior ocelli. First two antennal joints reddish, the first scarcely longer than the second, the third twice as long as the first. Entire pile of the thorax, pleura, coxæ, venter and abdomen black. All the femora robust, twice as thick as their tibiæ, the middle and hind ones bearing numerous, rather long bristles on their under side. 6 mm.

Texas.

Empis spectabilis Loew (Fig. 109).

Cent. ii, 21.

Female.—Gray, opaque, with short black pile. Head cinereous. Length of the proboscis nearly twice that of the head. Palpi yellow. Antennæ long, the first two joints dark badious and black-pilose, the third joint black, its apical style stout. Thorax quadrivittate with fuscous, the side vittæ much abbreviated. Coxæ reddish, cinerascent towards the base, black-pilose. Legs rufous, the extreme apex of the femora and the apex of each tarsal joint black, the last tarsal joint wholly black; the hind femora moderately thickened, the middle and hind femora with small black spines below. Halteres yellowish. Wings brownish red, the costal cell ochraceous, veins dark brown, stigma lighter fuscous; discal cell short; anterior branch of the third vein erect. 7 mm.

Maryland (Osten Sacken). Delaware Co., Pennsylvania.

Male.—The hairs of the under side of the palpi are long; the antennal style is not more than one-fifth the length of the third joint; the thoracic vittæ are narrow; the hairs on the base of the costa become longer, with two or three on each side bristle-like. Abdomen stout, deflexed at the tip, the fifth dorsal segment large, convex, provided with a prominent lateral reddish umbo, beneath this the venter is much constricted, the fourth ventral segment large, terminating in a flat transverse bifid process, the fifth and sixth ventrals small, crowded into the constriction, the seventh ventral moderately large; hypopygium small, the central filament thick, its base exposed, middle lamellæ quadrilateral, truncate at the tip, yellowish.

Clementon, New Jersey.

The male has eight long scutellar bristles, the female but four. The eyes of the male are narrowly separated by the front so that they nearly touch (vide Coquillett, Empidæ, p. 398, group 23).

It is to the group of the four following species that *Empimorpha barbata* belongs.

Empis lævigata Loew.

Cent. v, 49.

Male.—Wholly black, shining, black pilose. Eyes contiguous. Antennæ slender, black. Proboscis black, partly fuscous above, longer than the anterior tibiæ. Dorsum of thorax black pilose, very finely covered with cinerascent pollen. Scutellum convex, bare, except for six marginal bristles. Pleuræ and coxæ cinereopollinose, subopaque. Hypopygium deflexed, closed, the central filament hidden. In front of the hypopygium the venter has two incurved apophyses bearded with black pile. Legs simple, slender, clothed with short hairs and fine black bristles. Knob of halteres flavescent. Wings pale subfuscous, the stigma subfuscous, veins fuscous. 7.5 mm.

New Hampshire (Osten Sacken).

Empis virgata Coquillett (Fig. 108).

Proc. Nat. Mus., 1895, p. 408.

Male.—Black in all its parts, except the whitish knob of the halteres and the pulvilli; all pile and bristles also black. Eyes separated by an interval narrower than the lowest ocellus; third joint of the antennæ sublanceolate; the style nearly one-fourth as long as the joint. Proboscis slightly over twice as long as the height of the head. Thorax subshining, lightly gray pollinose and marked with three shining black vittæ; pleura grayish black pollinose, scutellum shining, bare, except the six marginal bristles and a few marginal hairs. Abdomen depressed, shining; hypopygium rather small, central filament hidden; on the under side of the fifth segment is a large, ovoid process, extending the entire length of the segment, its posterior end rather thickly beset with short, stout black bristles. Legs slender, front metatarsi one-half thicker and one-half longer than the middle ones, noticeably longer and thicker than the hind ones. Wings pale brown, stigma darker brown, all the veins perfect. 8 mm.

Washington (O. B. Johnson); British Columbia, Alaska.

Empis pellucida Coquillett.

Proc. Wash. Acad. Sci., 1900, p. 408.

Black, the palpi and horny part of proboscis, except at base, yellow, halteres yellowish white, bases of tibiæ sometimes reddish yellow; eyes of male more widely separated than the posterior ocelli; third joint of antennæ rather broad, gradually tapering to the apex, about five times as long as the style, proboscis twice as long as the height of the head; hairs and bristles of body and legs black; mesonotum slightly polished, marked with a median, light gray pruinose vitta, the lateral margins and pleura gray pruinose; scutellum bearing four bristles; abdomen highly polished, hypopygium of male small, almost bare, obliquely ascending, destitute of elongate processes, central filament robust, rapidly tapering to the apex, arcuate, free, except its apex; hind margin of fifth abdominal segment ventrally fringed with spinous bristles, many of which are as long as this segment; legs in both sexes simple, first joint of hind tarsi slightly thicker than that of the front ones, hind femora spinose on the under side; wings hyaline, veins dark brown, normal, stigma brown. 6 mm.

Alaska.

Closely related to *virgata* Coquillett, but in that species the spinous bristles on the ventral portion of the fifth abdominal segment in the male are arranged in a round cluster, and none of them exceed one fourth the length of this segment; both sexes have the mesonotum dark gray pruinose and marked with three distinct, polished black vittæ.

Empis fumida Coquillett.

Proc. Wash. Acad. Sci., 1900, p. 409.

Differs from the above description of *pellucida* only as follows: Palpi and proboscis black, legs always wholly black, eyes of male less widely separated than width of lowest ocellus, mesonotum highly polished, not distinctly vittate, scutellum bearing six or more bristles, hypopygium quite thickly covered with hairs, the central filament hidden, except, sometimes, its apical portion, wings pale brown, more yellowish at base and in costal cell. 7 mm.

Alaska.

It is with hesitation that I have included this, the following, and even the preceding species in the same group with *virgata*. In more than one case has Mr. Coquillett arranged a series of species the description of one of which depends upon the foregoing, until at last a form is reached in no wise related to the first species, but which depends on the first description for its recognition. In the present instance *pellucida* depends on *virgata*, *fumida* on *pellucida*, and *infumata* on *fumida*, but in no case but the first is mention made of the peculiar and very conspicuous ventral process of the males.

Empis infumata Coquillett.

Proc. Wash. Acad. Sci., 1900, p. 409.

Same as *fumida*, except that the palpi and horny parts of the proboscis are yellow, central filament of hypopygium of male free, except at the apex, no fringe nor cluster of spinous bristles on ventral portion of the fifth or other abdominal segments, hind femora destitute of spinous bristles on the under side, at most with a few weak bristles on the apical fourth. 5 mm.

Alaska.

Empis cæligena sp. nov. (Fig. 107).

Male.—Ground color black, silvery gray pollinose. Eyes wine color, contiguous for about one-third of the distance between the antennæ and the ocelli, facets uniformly small; palpi pale fuscous, short, extending straight forward, with numerous long black hairs below, proboscis not twice the head-height in length, slender, reddish at the base, black apically; antennæ a little longer than the head-height, black, first and second joints short, provided with black hairs, second joint one-half the length of the first, third joint slender, beyond the basal fourth of almost equal thickness, blunt at the tip, the arista small, one-eighth as long as the third joint; occiput cinereous, with numerous black hairs indistinctly, irregularly arranged in three transverse rows, the lower occiput bare in the middle. Thorax gray dusted, not at all tinged with brown, the usual four vittæ of the dorsum black, not brown, broadly bordering the two outer vittæ are rather long hairs, the marginal bristles of the dorsum not markedly thicker than the other hairs, humeri with rather long hairs, pronotal collar consisting of short hairs, above the base of each coxa is a small bunch of hairs, the prehalteral row consisting of twelve hairs, scutellum with about twelve marginal bristles. Abdomen short, robust, deflected at the tip, with silvery-gray pollen, not silky in lustre, with long fine hairs, especially noticeable on the sides of the basal segments; antepenultimate ventral segment with a short, broad, median bifurcate process, lateral to which the posterior margin of the segment is emarginate, sixth ventral segment small, hidden by the fifth and the last; hypopygium small, but robust, closed, middle lamellæ large, almost cordiform with the emargination above, enveloping nearly the whole of the hypopygium, upper lamellæ small, central filament completely hidden. Coxæ black, cinereous, paler apically, front and middle ones with numerous fine black hairs on the forward side, hind ones with a few long hairs on the inner and outer sides; legs simple, fuscous, extreme tip of the femora and the tarsi darker, tarsi almost black; legs wholly covered with long and rather dense black hairs, short, dense and almost bristle-like on the plantar surface of the tarsi, femora stout, but not thickened, hind ones reaching beyond the end of the abdomen, hind tibiæ slightly thicker than their femora, the other tibiæ more slender; metatarsi not thickened, front ones as long as the two following joints, middle ones equal to the next, hind ones somewhat shorter, than the next two joints; pulvilli grayish, not enlarged. Halteres pale yellow. Wings hyaline, with a faint brownish tinge, stigma nearly obsolete, veins strong, fuscous; discal cell short, broad, the first section of the fourth vein bounding it anteriorly, but slightly less than two-thirds the length of the second section; furcation of the third vein takes place beyond the end of the marginal cell, the posterior branch ending just in advance of the extreme wing-tip; twice the length of the anterior branch; two rather long bristles present near the base of the costa.

Female.—The female differs from the male in the following characters: eyes separated nearly twice as widely as the posterior ocelli; scutellum generally with eight bristles; abdomen more flattened, tip not deflected, color of the abdomen more yellowish gray; the hairs of the legs much reduced, those of the underside of the femora more evidently bristle-like; tibiæ not as thick as the femora; only one long costal bristle near the base of the wing. 5.5 mm.

Alabama (C. F. Baker).

Empis teres sp. nov. (Figs. 133–142).

Male and Female. Length 4–5 mm.—Black, silvery gray pollinose (female less silvery). Occiput, front and face gray pollinose; eyes maroon color, facets uniformly small, eyes of the male separated the width of the front ocellus, the front of the female broader; palpi short, slender, not exceeding the mouth-opening, pale yellow; proboscis once and one-half the eye-height, slender yellowish; antennæ slender, as long as the eye-height, first joint moderately long, first and second fuscous, third joint black, as long as the first two together, arista one-third the length of the third joint; bristles of the occiput arranged in two definite rows. Thorax dusted with silvery gray in the male, female with a slightly brownish tinge to the notum, dorsum with indications of four darker vittæ, the outer two abbreviated in front, and very faint, the intervittal spaces with sparse short black bristles, but few humeral and marginal bristles, the series in front of the halteres indefinitely consisting of about five bristles, of which only two are long; scutellum with from four to six marginal bristles, generally with two well-separated median and two short outer bristles; pectus devoid of bristles. Abdomen sparsely hairy, dull grayish in the female, silky white pollinose in the male, ground color of the narrow posterior margins of the individual segments whitish; hypopygium compressed, narrow, gaping, the central filament slender, strongly bowed, hidden at the very tip, the lamellæ extending obliquely upward, lightly dusted, middle lamellæ emarginate above, the upper lamellæ not deeply but broadly excised above. Coxæ and legs yellowish, the tips of the trochanters and of the femora narrowly black, the black hairs of the legs not dense, in the male the hairs are long, especially on the outer portions, tarsi and more or less of the tip of the tibiæ darkened; legs of the female simple and slender, of the male slender, but the tip of the hind femora beneath with three subterminal small tubercles in longitudinal series, the proximal globose, the middle one a little toward the inner side, truncate and bounded outwardly by a distinct black spine, the third medially placed and bounded both inwardly and outwardly by a row of black bristles, the outside row being of greater extent; corresponding with the femoral tubercles the base of the tibia is peculiarly dentate, the three basal teeth evident and each tipped with a black spine, beyond the teeth the under edge of the tibia is serrulate and ciliate with short black hairs; the hairs of the outer edge of the tibiæ and tarsi long, tarsi of both male and female beneath with short thick black bristles, metatarsi about equal to the next three tarsal joints, the front metatarsi of the female and the middle metatarsi of the male are, however, shorter, the hind metatarsi of the female and the fore and hind ones of the male are as thick as the tips of the tibiæ. Halteres pale yellow. Wings clear hyaline, veins narrow fuscous, stigma obsolete, the third vein stronger than the others, furcate before the tip of the marginal cell, the furcation

acute, the anterior branch straight, the posterior branch terminating in the wing-margin slightly beyond the tip; first submarginal cell broader than the marginal, about as broad as the first posterior cell; sixth vein evanescent toward its apex; no strong costal bristles present.

Nineteen specimens; Idaho (J. M. Aldrich).

Empis loripedis Coquillett (Fig. 131).

Proc. Nat. Mus., 1895, p. 400.

Male.—Head black, gray pollinose; eyes separated as widely as the posterior ocelli, facets of a uniform size; antennæ black, third joint somewhat over twice as long as the first, slender, tapering gradually to the middle, thence of an equal breadth; style nearly one-third as long as the third joint; proboscis one and one-half times as long as the height of the head, palpi yellow. Thorax black, opaque gray pollinose, marked with four dark brownish vittæ, almost destitute of pile, the bristles black; pleura black, sometimes partly yellowish, bluish gray pollinose, pile in front of halteres black; scutellum black, gray pollinose, bearing two bristles. Abdomen compressed, shining, black; the broad hind margin of each segment laterally yellow, sometimes extending to the anterior edges of the segment, dividing the black color into three vittæ, medio-dorsal and lateral; pile of abdomen sparse, black; venter yellow; hypopygium rather large, ascending, abundantly black-pilose, middle lamellæ yellow, broadening to the tip; filament very thick at base, then suddenly attenuated and bristle-like, arcuate. Legs, including the coxæ, light yellow; apical half of front tibiæ and extreme apex of the others, front tarsi wholly, apex of the first two joints and the whole of the remaining joints on the middle and hind tarsi, usually but not always a dark brown; all the tibiæ and tarsi furnished with numerous long black pile; on the under side of each hind femur before its apex is an irregular, three-pronged process, and on the inner side of each hind tibia near its base are two processes, one behind the other; just before the basal process the tibia is hollowed out; front metatarsi nearly twice as long and three times as thick as the middle ones, hind metatarsi one-half thicker and one-third longer than the middle ones. Knob of halteres light yellow. Wings dark gray, stigma slightly darker, vein dark brown. 6–7 mm.

Female.—Like the male, except that the hind femora and tibiæ are destitute of processes, the front metatarsi are not thicker than the middle ones, while the hind metatarsi are much thicker than and fully as long as the front ones; abdomen tapering to the apex.

Illinois and Ohio.

Empis gladiator sp. nov. (Fig. 134).

Male and Female.—Length 6–7 mm.—Rather slender, more or less yellow species. Head black, cinereous, occiput somewhat conically formed; eyes wine-red, separated a little more widely than the posterior ocelli, which are, however, rather close together, facets small, uniform; palpi slender, yellow, with very few short hairs; proboscis one and one-half times the head-height, yellowish, the extreme tip darkened, the labella fleshy, fulvous, reaching down one-half the length of the proboscis in the male and to the tip in the female; antennæ slender, as long as the head-height, the first two joints dark fuscous, provided with a

few short hairs, the first joint over twice as long as the second, the third joint twice as long as the first, glabrous, lanceolate, somewhat blunt in the female, black, the arista two-thirds the length of the third joint; bristles of the occiput in two rows. Mesonotum normally with brownish gray dust over a black ground, sometimes the covering effaced, when the thoracic disc is highly polished, marked with four brown, conspicuous, rather broad vittæ, the outer two abbreviated in front; the intervittal spaces with a few minute bristles, margin of the notum with four macrochætæ, one on the humerus, one supra-alar, one on the post-alar ridge and one in front of this; scutellum with two marginal macrochætæ; the humeri, pectus, post-alar ridge, margin of the scutellum, sides of the metanotum and the pleuræ largely yellowish, dusted with cinereous; the ground color of the pleuræ darkened above the base of the four posterior coxæ and in front of the root of the wings; bristles of the pronotal collar slender, sparse, of the metapleural row about three in number. Abdomen shining, yellowish, with an indistinctly limited median blackish stripe; the segments with a subapical series of long slender black bristles, the hairs of the abdomen sparse and minute; hypopygium comparatively long, vertical, yellowish, not densely provided with hair, nearly closed, but its parts visible, central filament slender, curved, exposed, except near the tip, the middle lamellæ erect, their posterior margin inflected, the apical corner with a deep emargination; the upper lamellæ relatively small, with dense, fine hairs; styles of the female reddish. Coxæ yellow, all provided with few black hairs on the front surface near the tip; trochanters and tip of femora with the usual small black spots; legs yellow, except the more or less brownish tarsi, rather slender, the hind femora not surpassing the abdomen and not longer than the tibiæ; none of the metatarsi thickened, the front ones as long as the next three joints, the hind ones somewhat shorter, the middle metatarsi as long as the two succeeding joints; the last four tarsal joints with a double series of spinose hairs; legs clothed with short black hairs, longest distally and conspicuous on the hind legs of the male; trochanters simple; the hind femora of the male swollen on the outer third, provided with a subapical median tubercle on the under side, which is tipped with a slender black spine curved towards the end of the femur, on a line with this, but on the infero-exterior edge, is a short fringe of black bristles, on the outer under edge, opposite the fringe, is a scoop-shaped triangular dilatation of the femur, with a subapical emargination on the hind edge; these processes articulate with structures near the base of the tibia, the median spine of the femur corresponding with an elongate blunt tubercle, into the emargination of the femoral scoop fits a small tooth which is provided on the outer side with a small fringe of black bristles; the apex of the hind femora provided with a series of bristles above, and narrowed as in the angulate basal part of the tibia; legs of the female simple, not thickened. Halteres pale yellow. Wings slender, long, hyaline, with a faint brownish tinge, no stigmal spot present; the furcation of the third vein, which takes place opposite the end of the marginal cell, the posterior branch ending beyond the wing-tip; discal cell rather small, the proximal section of the vein bounding it anteriorly one-fourth the length of the second section, no long costal bristles present.

Numerous specimens of both sexes. Lawrence, Kansas (Dr. S. W. Williston).

Empis arthritica sp. nov. (Figs. 135, 144).

Male and Female. Length 5 mm.—Slender, pale gray pollinose. Eyes of the male separated as widely as the length of the second antennal joint, in the female somewhat more, facets uniformly small; palpi small, pale yellow, with but one minute subapical black hair; proboscis about twice the height of the head, reddish, labella as long as the proboscis, pale yellow; antennæ slender, black, about as long as the head-height, the first joint two times as long as the second, the third joint nearly three times the length of the first, slender, lanceolate, not sharp at the tip, arista scarcely longer than the second antennal joint; occiput black, cinereous-pollinose, its bristles small, in two transverse rows. Thorax light gray pollinose, the dorsum quadrivittate with brownish, the intervittal bristles very sparse and minute; one large humeral bristle present, the marginal macrochætæ three in number; in front of the halteres two small and one minute bristles, the scutellum with two central small and two outer minute bristles; no pectal bristles, pronotal series minute; the ground color of the pectus, the humeral callosities, edge of the scutellum, and two pleural spots above the middle and hind coxæ more or less yellowish. Abdomen shining, glabrous, except for a few short submarginal bristles, yellowish; hypopygium yellow, moderately small, compressed, nearly vertical, nearly closed, central filament thickened at the base, curved, exposed, except the tip, middle lamellæ comparatively small, convex, excised at the tip, the upper lamellæ small, exposed. Legs including the coxæ yellow, trochanters and femora tipped with a small black spot, the tarsi brownish apically; legs slender, the hind femora reaching or surpassing the end of the abdomen; all the metatarsi about as long as the two following joints, the front ones of the male a little longer, nearly as thick as the tibiæ but not appearing swollen, the tarsi spinose beneath, pulvilli minute, yellowish; trochanters simple; hind knees of the male armed, the femora gradually but slightly thickened distally, at the distal fourth on the outer inferior edge with a small tubercle capped by a pencil of black bristles, beyond which is a series of five scattered bristles, the inner inferior corner is explanate into a concave plate which is excised proximally to a spur and carina, the tibia exceedingly thin at its angular base, then suddenly swollen inwardly and produced as a strong bristly process which articulates into the concavity of the femoral plate, the outer edge of the abrupt tibial swelling deeply excised to receive the incurved femoral spur. Halteres pale yellow. Wings narrow, nearly hyaline, no stigmal darkening, veins fine, dark fuscous, the third vein furcate slightly in advance of the end of the marginal cell, its posterior branch terminating slightly beyond the wing-tip; the first section of the anterior border of the discal cell one-fourth the length of the second section, the discal cell narrow; first and second posterior cells of equal width at the base; costa destitute of long bristles.

Montgomery Co., Pennsylvania (C. W. Johnson).

Empis podagra sp. nov.

Male and Female. Length 6 mm.—Black, more or less coated with cinereous pollen. Eyes separated as widely as the distant posterior ocelli, facets uniform, small. Palpi black, sparsely bristly toward the tip; proboscis wholly black, about one and one-half times the head-height. Occipital bristles dense, in two rows. Thorax wholly cinereous, marked with four brown mesonotal vittæ

which are as wide as the intervittæ; intervittal bristles minute, sparse; scutellum with four bristles, the central pair widely separated; six fine hairs in the metapleural row. Abdomen slender, black, the male abdomen is shining above, excepting the first and half of the second segments, abdomen of the female sparsely dusted; hypopygium shining, black, terminal, not large, upper lamellæ visible one-third as large as the oblong middle lamellæ, both densely hairy, central filament moderately slender, strongly arcuate, basal part exposed. Coxæ cinereous, trochanters black; legs short, femora brown, piceous apically, hind ones reaching the fifth abdominal segment, tibiæ piceous, black apically, tarsi black; of the male the hind femora are provided with a long sharp bristly projection just beyond the middle of the outer under side, between this and the tip of the femur with a small median mammiform tubercle, the apical fourth of the outer under edge is fringed with sparse bristles commencing in a dense pencil, the apical eighth of the inner under edge is provided with a dense fringe; the hind tibiæ of the male suddenly swollen near the knee to a flat prominence tipped with a long black pencil, diagonally across from this is a swollen tubercle provided with a black brush on its flattened top, the hind tibiæ densely bristly; hind metatarsi thickened, and of the male the front ones likewise, the hind ones of less diameter than their tibiæ, the front ones of greater diameter, tarsi densely spinose below. Halteres yellow. Wings hyaline, with a faint cinereous tinge, stigmal spot elongate, the furcation of the third vein slightly before the tip of the marginal cell, the vein between the first basal and the discal cells shorter than that between the second basal and the discal cells, and one-fourth the length of the second section of the anterior border of the discal cell; anal vein thin.

Three males and two females; Juliaetta and Peck, Idaho. From Prof. J. M. Aldrich.

Empis mira Bigot.

Enoplempis mira Bigot, Bull. Soc. ent. France, 1880, p. 47.

Enoplempis Bigot.—Hind femora robust; below, at the tip, strongly armed and unidentate, the tibiæ below at the base similarly mucronate and unidentate, the teeth with small hairs, thick.

E. mira. Male.—Fulvo-testaceous; the apex of the antennæ, the proboscis above, five vittæ of the thorax, the lateral ones interrupted, fusco-canous; wings yellowish. 6 mm.

California.

Empis Bigoti nom. nov.

Enoplempis cinerea Bigot, Bull. Soc. Ent. Fr., 1882, p. 91.

Cinereous, antennæ fuscous; front cinereous; thorax with four castaneous vittæ; incisures of the abdomen fuscous; halteres testaceous; trochanters infuscated; legs fulvous; femora, the apex of the tibiæ and the tarsi fuscous, posterior tibiæ infuscated over all; wings subhyaline, with a scarcely perceptible, elongate, very slender fuscous stigma. 6 mm.

California.

In addition to this the generic characters may be added, as given under *E. mira* Bigot.

In as much as Mr. Coquillett has recognized "what is evidently this species" it seems unjust to Mr. Bigot that "as the name *Empis cinerea* is preoccupied for a European species, Bigot's description of *Enoplempis cinerea* should be cancelled." It is better to adopt a more general precedent, so hereafter the species may be known as *E. Bigoti*.

Empis manca Coquillett.

Proc. Nat. Mus., 1895, p. 406.

Male.—Head black, gray pollinose, eyes separated the width of the lowest ocellus, facets of a uniform size; antennæ black, third joint narrow, elongate, style one-third as long as the third joint; proboscis one and one-half times as long as height of head, palpi yellow. Thorax black, opaque, gray pollinose, marked with four black pollinose vittæ, its sparse pile and bristles black; pleura black, light gray pollinose, its pile black; scutellum black, gray pollinose, bearing four black bristles. Abdomen dark brown, hind margin of each segment whitish, opaque whitish pollinose, its pile or bristles along the hind margins of the segments long, black; hypopygium yellowish brown, very large, erect, its pile black; central filament very robust, arcuate, free except towards the apex, its extreme tip dilated. Legs slender, yellow, including the coxæ; on the under side of the hind femora, before the apex, is a low swelling, in front of which is a robust, backwardly directed hook, while between the apex of the femur and the swelling on the inner side is a black, conical projection fringed near the base behind, with one large and two small tooth-like projections; on the front and also on the hind side of the hind tibiæ near the base is a fringe of short black bristles, below which, on the inner side of the tibia, is a conical projection, at which point the tibia is rather suddenly bent outward; hind metatarsi slightly thicker, but shorter, than the front ones. Halteres yellow. Wings grayish hyaline, stigma and veins brown, a long bristle on the costa near its base.

Female.—Same as the male, except that the front is slightly broader, the abdomen blackish, light gray pollinose, and the hind legs simple, but much thicker than the others. 4–5 mm.

Southern California (Coquillett).

Empis valentis Coquillett (Fig. 138).

Proc. Nat. Mus., 1895, p. 402.

Female.—Differs from *Empis comantis* as follows: femora entirely yellowish, apices of tibiæ and whole of tarsi black, third antennal joint twice as long as the first, style less than one-half as long as the third joint. Pile of thorax sparse, black; on each end of the pleura, coxæ, abdomen and venter, wholly black; on venter and on sides of abdomen very short and sparse. Scutellum destitute of white pile, naked, except for the ten marginal bristles. Abdomen opaque, light gray pollinose, hind margins of the fifth and sixth, and the following segments wholly, shining. Femora not thickened, the hind ones scarcely thicker than their tibiæ; pile and bristles of femora minute. Wings hyaline, anterior branch of the third vein straight and nearly perpendicular. 9 mm.

Northern California.

This species, which is associated with *E. comantis* only in locality, must be further characterized thus:

Male and Female.—Eyes of the male widely separated. The usual apical femoral black spot is broadened in the male; the hind femora of the male are curved and are provided with a large bifid tubercle on the under side at the outer fourth, the inner spur of which is short, the outer provided with a bunch of short black hairs, beyond this on the inner under edge of the femur is a small mammiform process, beyond which is a fringe consisting of four small black spine-like hairs; the hind tibiæ are nearly straight, near the base on the inner under side with a large tubercle, apically provided with a bunch of short black hairs forming a spur-like pencil, distal to this on the outer under edge of the tibia is a still larger tubercle, which is fringed outwardly by a series of long black hairs. Metatarsi not enlarged, tarsi strongly spinose beneath. Hypopygium terminal, small, closed, central filament swollen at the exposed base, upper lamellæ projecting beyond the middle ones. Halteres black. The scutellar bristles vary in number from six to twelve. The bristles in front of the halteres are dense, about twenty in number.

Numerous specimens from various parts of California.

Empis clauda Coquillett.

Proc. Wash. Acad., 1900, p. 407.

Black, the palpi, proboscis, humeri, lateral margins of metanotum, scutellum, a large spot below insertion of each wing, the halteres, coxæ and remainder of legs, also base of venter, yellow, apices of tarsi brown; eyes of male separated less than width of lowest ocellus, third joint of antennæ broad at base, tapering rapidly to the apex, about twice as long as the style, proboscis slightly over twice as long as height of head; hairs and bristles of body and legs black; mesonotum opaque, gray pruinose, marked with four indistinct, brownish vittæ; scutellum bearing four bristles; abdomen slightly polished, hypopygium small, ascending obliquely, the dorsal piece prolonged at each posterior corner in the form of a flattened, almost linear process, central filament unusually robust, arcuate, free, except toward its apex; no ventral process in front of the hypopygium; hind femora of male each bearing a hook-like process on the under side a short distance before the apex, curved backward and covered with short hairs, while beyond it are two bare, pimple-like swellings; on the inner side of the femora, nearer the apex, is a fringe of about five rather short spinous bristles; hind tibiæ of male each bearing a bare, slightly arcuate process on the outer side near the base, while opposite it, on the inner side, is a low prominence beset with short bristly hairs; legs of female simple, not fringed with scales; wings grayish hyaline, stigma brown, veins brown, normal. 5–7 mm.

Alaska.

Empis poplitea Loew.

Cent. iii, 29.

Male and Female.—Cinereous, opaque, all the hairs and bristles short, black. Head concolorous, black-pilose, eyes of the male separated. Antennæ black, third joint elongated and strongly attenuated towards the apex. Palpi very small, testaceous. Proboscis strong, black, badious above, nearly equalling twice the length

of the head. Thorax with four fuscous vittæ. Hypopygium of the male small, rather sunked and closed, the upper lamellæ small, grayish black, the lower small, testaceous, the central filament hidden. Coxæ blackish, cinereous. Legs red, with sparse black pile, the hairs of the tibiæ and of the tarsi longer and a little more dense; the extreme tip of the femora spotted with a black dot; apex of the tibiæ blackish; tarsi black, the base of the first joint often dark red; posterior knees of the male drawn out into three strong apophyses, one at the tip of the femora and two at the base of the tibiæ. Halteres dusky yellow. Wings rather long, the veins strong, fuscous, stigma pale yellowish, rather faint. 5 mm.

Sitka, Alaska (Sahlberg).

Unfortunately the few minor characters omitted in this description make it impossible to include this species in our table.

Mr. Coquillett determines specimens received from Prof. Cockerell, from the Hudsonian Zone of New Mexico as Loew's species.

The following characters are common to the remaining species, which, with the five preceding, constitute a very natural group.

Body black, closely pollinose, occiput biseriately black bristly, densely above and beneath. Eyes dark red, separated as widely as the posterior ocelli at the narrowest part of the front in the male, and slightly more in the female. Palpi small, slender, curved, yellowish, more or less fuscous at the base, with one preapical minute black bristle, or none. Proboscis one and one-half to two times the head-height, dark red, not thick but strong, the labella slender, black. Antennæ black, equalling the eye-height, the first two joints cylindrical, with a few short black hairs, and more or less pruinose, together shorter than the third joint; third joint lanceolate, opaque jet black, the style one-third the length of the third joint, of smaller diameter than the tip of the joint. Thorax quadrivittate, generally with broad brown vittæ, the middle ones abbreviated posteriorly and the lateral ones anteriorly; the intervittal bristles minute, a small median row present; a bunch of bristles under the halteres, dorsum margined by three or four short macrochætæ. Abdomen straight, opaque pollinose, longer than the head and thorax together, with very few bristles and no pubescence; hypopygium small, closed, densely pubescent, the central filament swollen at the base, of the shape of a scorpion-sting, reddish. Coxæ dusted, provided with black bristles on the forward side, the hind ones always with a bunch near the tip below, trochanters tipped with black or wholly black, femora with a narrow terminal black ring if light colored;

legs more or less shining; tarsi always short spinose beneath; the hind knees of the male with peculiar sexual armament, legs of female simple, not fringed with scales; pulvilli and claws small, the pulvilli dirty white, the claws reddish at the base, black apically. Halteres pale yellow. Wings nearly pure hyaline, the veins strong, dark fuscous, no stigmal spot or with a very faint indication of one, no strong costal bristles.

Western species.

Empis aerobatica sp. nov.

Male and Female. Length 5 mm.—Gray-dusted species. Eyes of the male separated twice as widely as the posterior ocelli, of the female scarcely more. Palpi yellow, with one minute hair beneath. First antennal joint scarcely one and one-half times the length of the second joint. Thoracic vittæ narrow, as broad as the intervittæ, generally well defined, the intervittæ gray, with a slight bluish tinge when viewed in a strong light; but one marginal bristle above the base of the wings. Bristles of the occiput, pronotum, humeri, scutellum, abdomen and legs minute; scutellum with four bristles; about five minute bristles in front of the halteres, pectus with about three minute bristles on each side. Hypopygium in part gray-dusted; central filament gradually narrowed, brown; upper lamellæ triangular, about two-thirds as large as the middle ones, wholly visible. Coxæ more or less darkened at the base, legs fuscous, darker on the femora above and the tibiæ apically; tarsi short spinose, front and middle ones not enlarged, hind ones moderately thickened; hind femora not thicker than the tibiæ, not reaching the hypopygium, in the male provided with a short diagonally transverse process, the inner apical angle of which bears a pencil of black hairs, beyond which the inner inferior edge of the femur is ciliate with about four bristles and a few hairs; the base of the tibia bears on the under side two prominent tubercles, the first with a scattered pencil of black bristles, the second with a brush of short hairs on its obliquely truncate apical edge. Wings narrow, clear hyaline, those of the male with a very long base; furcation of the third vein variable, before the end of the marginal cell, or opposite the end, the posterior branch terminating near the extreme wing-tip; discal and posterior cells rather elongate, the hind margin of the discal cell about three-fourths the length of the outward continuation of that vein; anal vein much reduced, sharply vanishing.

Seven males and four females; California and Idaho.

This is the balloon-making fly about which Messrs. Aldrich and Turley have written a most entertaining account in the American Naturalist, 1899. The male forms a large hollow frothy bag, in the front end of which is imprisoned a small fly. Flying with this structure between its hind legs it courts the female who alights on the back of her selected mate. The pair then settle slowly to the ground, and after copulation the male discards the balloon which then has served its purpose of attracting the female during courtship.

Empis nodipes sp. nov. (Fig. 143).

Male. Length 6.5 mm.—A slender species. Cinereous, plumbeous. Eyes maroon-colored, separated as narrowly as the posterior ocelli, facets moderately small; palpi small, fuscous, with one short subapical black hair; proboscis scarcely one and one-half times the head-height, reddish, the black labella not reaching to the tip; antennæ slender, shorter than the head-height, black, piceous at the base, first joint over two times the length of the second, third joint three times the length of the first, lanceolate, the arista as long as the first joint; bristles of the occiput sparse, minute, in two transverse series. Thorax plumbeous gray, the dorsum with four narrow brown vittæ, the outer much abbreviated anteriorly; the intervittal bristles minute, the marginal macrochætæ short, few in number; four short bristles in the row in front of the halteres, pronotal bristles wanting (broken ?); but two small scutellar bristles. Abdomen slender, cinereous, opaque, without macrochætæ; hypopygium small, closed, central filament much swollen at base, the basal part exposed, remainder hidden, middle lamellæ convex, shining, truncated above, hiding the small upper lamellæ. Legs including the coxæ yellow, slender, tips of trochanters and of femora minutely black, tarsi brownish toward tip, tarsi slender, long, spinose beneath, metatarsi not thickened, macrochætæ of legs moderate; trochanters unarmed; hind femora swollen near the tip, the outer inferior angle of the swelling with a fringe of black bristle-like hairs; hind tibiæ with a similar swelling near its base, but ciliate on both sides with black hairs, hind tibiæ on inner side at the tip fimbriate with short yellow scales; hind femora not reaching the hypopygium, scarcely as thick on basal portion as the apical part of the tibiæ. Halteres pale yellow. Wings subhyaline, veins thin, dark fuscous, stigma obsolete; third vein furcate before the tip of the marginal cell, the posterior branch ending beyond the tip of the wing; the first section of the front border of the discal cell one-fourth the length of the second; second posterior cell very narrow at its base; no long costal bristles.

A single male; Magdalena, New Mexico.

Empis serperastrorum sp. nov. (Figs. 136, 145).

Length 6-7 mm.—Olivaceous gray species of exceedingly great variability in the color of the appendages. Palpi reddish to black, with a few hairs; proboscis wholly black, sometimes reddish on basal part, labella never exceeding the proboscis in length. First antennal joint two times the length of the second. Occipital bristles sparse, or dense; thoracic bristles sparse; scutellum with two small widely separated bristles, females often with four; the row in front of the halteres consisting of from three to five small bristles. Hypopygium small, terminal, not higher than the abdomen, or sometimes slightly larger, upper lamellæ concealed, central filament flat exteriorly, completely hidden, the tip not explanate. Legs including the coxæ wholly black, or wholly yellow, except the darkened tarsi, rather stoutish; the hind femora reaching the tip of the abdomen in the female, but comparatively shorter in the male; the hair-like bristles rather dense on the front metatarsi and on the outer portion of the hind tibiæ of the male; all the parts of the female leg slender; of the male the front metatarsi are swollen slightly beyond the thickness of their tibiæ, the remainder of the legs, except the hind knees, simple; hind femora widened laterally on the

outer third before the tip, on the underside with a short, thick, transverse bifurcate process, the outer projection of which is closely fimbriate within with black scale-like hairs, while the inner is sharply angulate and terminates in a distal direction as a short spur, midway between the outer projection and the tip of the femur are three closely placed bristles; articulating into the distal end of the femur is a large bristling projection on the tibia, distal to which and articulating with the fimbriate edge of the outer bifurcation of the femoral process is a small median tubercle, across from this on the inner (posterior) side of the tibia is a prominent bifurcate bristly process directed distally and medially, beyond which is another median tubercle, but larger and more pointed than the first, or sometimes reduced to a mere swelling; the tips of the two bifurcate processes are always black, the bases are always concolorous with the rest of the legs; middle tibiæ of both sexes tipped with a series of from five to eight stiff black bristles on the inner side. Wings sometimes faintly smoky, veins narrow to strong; stigmal spot very faint; furcation of the third vein opposite or in advance of the tip of the marginal cell, its posterior branch ending beyond the wing-tip; the first section of the anterior boundary of the discal cell about one-fourth the length of the second section; hind margin of the discal cell shorter than the outward continuation of that vein.

Colorado and Idaho (J. M. Aldrich). Ninety specimens of both sexes.

Empis dolabraria sp. nov.

Male and Female. Length 6 mm.—A brownish species. First antennal joint one and one-half times the second; palpi yellow; occipital bristles numerous, confused, long below. Scutellum with six marginal bristles, the cluster in front of the halteres consisting of six to eight, a small bunch of hairs present above the base of the front coxæ; mesonotal vittæ broad, brownish, abdomen of the male brownish gray, concolorous with the scutellum, intervittal spaces and the pleuræ; abdomen of the female gray. Abdomen short; hypopygium small, outer portion of the base of the central filament visible, the middle lamellæ small, the upper lamellæ porrect, extending upwards. Coxæ blackish, the very tips paler, trochanters black; legs short, reddish, the tarsi black, hind femora and tibiæ somewhat bent, rather stout, the hind femora not reaching the end of the abdomen, tarsi long spinose beneath, hairs of the tibiæ strong, bristles short; male hind femora slightly swollen on the posterior side before the tip, beneath with a subapical transverse bifurcate process, the outer projection of which is long and tipped with a minute pencil, male hind tibiæ suddenly enlarged beyond the knee and there sparsely ciliate on both sides with black bristles, beyond the swelling there is a prominent process on the outer inferior edge fringed on the proximal side with short scale-like bristles. This articulates with the larger projection of the femoral process. Wings rather broad in the male, slender in the female, clear hyaline, the third vein furcate beyond the tip of the marginal cell, the posterior branch ending at the wing-tip, the proximal section of the anterior boundary of the discal cell more than one-fourth as long as the distal section, the hind boundary three-fifths as long as the continuation of that vein.

A male and a female; California (Baron).

Empis dolabraria subsp. nov. **disconvenita.**

An incipient species which will have to be connected with the foregoing for the present.

The differences lie in the wing-neuration; the furcation of the third vein takes place opposite the end of the marginal cell, the posterior branch of the fork terminates beyond the extreme wing-tip; the discal cell is larger, the first section of its front border is less than one-fifth the length of the second section, while the hind border is as long as the continuation of that vein. The occipital bristles are much stouter in this form.

One male and one female; California.

Empis falcata sp. nov. (Fig. 137).

Male and Female. Length 7.5 mm. or less.—A very slender species, with sparse bristles. Face and front narrow; palpi pale, with two minute preapical hairs: labella less than two-thirds as long as the proboscis; antennæ slender, comparatively long, the first joint fully two times as long as the second, the third joint narrow at the base and gradually attenuated, rather blunt at the tip, the style less than one-fourth the length of the third joint. Scutellum with two small widely separated marginal bristles, and a minute outer pair on each side of these; no pectal bristles; pronotal collar minute but distinct; in front of the halteres are three small bristles. Hypopygium projecting above the abdomen, comparatively large, the central filament not suddenly enlarged, plainly visible at the base, the middle lamellæ large. Legs slender, wholly yellowish, except the usual spots on the trochanters and the knees, their bristles strong, especially on the hind tibiæ and the tarsi, but nowhere lengthened; tarsi long and slender, especially the front and middle pairs; hind femora not reaching the hypopygium, with a subapical lateral tubercle on the posterior side, in front of which on the under side is a transverse bifurcate process, the inner (posterior) portion of which is slender, strongly curved and pointed, the outer is short and stout and tipped with a pencil of black scale-like bristles; hind tibiæ somewhat curved, slender at the knee, articulating with the lateral femoral process is an emarginate, almost medially placed process, the posterior portion of which is tipped with a small curved brush of black hairs, diagonally in front of this, but still on the lower side of the tibiæ, is a broad, flat protuberance, black apically and fringed on the outer edge with long stout black bristles. The third longitudinal vein furcate at the tip of the marginal cell, the posterior branch ending beyond the extreme wing tip, the first section of the anterior border of the discal cell less than one-third the length of the second section, the hind border shorter than the continuation of that vein.

One male from Berkely, California, March 26, 1897; collected by Dr. Wm. M. Wheeler. A male and a female, Juliaetta, Idaho; collected by Prof. J. M. Aldrich.

Empis canaster sp. nov. (Figs. 139, 140).

Male and Female. Length 7 mm.—A slender gray species. Palpi infuscated at

the base, provided with one long and several short preapical fine black hairs; labella more deeply bifid than usual in this group; first antennal joint two times the second; the third joint rather slender; postocular bristles short. Prothoracic collar even; humeral bristles small; no pectal bristles; scutellar bristles inconstant, generally two small and two minute bristles; the row in front of the halteres with three to five small bristles. Abdomen slender, long; the middle lamellæ of the hypopygium erect, strongly shining, covering the upper lamellæ, the swollen basal part of the central filament visible. Coxæ reddish apically, or wholly yellow, their bristles reduced; legs slender, hind femora shorter than the abdomen; legs reddish, except the front tarsi and more or less of the remaining tarsi, which vary from brown to black; front metatarsi of the male three-fourths as long as their tibiæ and of slightly greater diameter; bristles of the legs becoming fine and long apically, especially on the outer side of the male hind tibiæ; the spine-like bristles of the plantar surface of the tarsi rather long; armament of the hind knees of the male close to the femero-tibial joint; hind femora slender, but little thickened at the armament, hind femora and tibiæ but little bent; near the tip of the hind femur the underside is produced into a short, bipartite, transverse process, the inner projection of which is short and sharply angular, the outer flattened, situated on the median line and capped by a close fringe of short black scales; between this structure and the tip of the femur is a short sharp, backwardly directed, median tooth; hind tibiæ gradually enlarged from the knee, the slender base with a single long process on the under side, tipped with a pencil of black bristle-like hairs; these structures are not bounded by fringes of bristles. Wings long, slender, very lightly infumated; the third vein furcate before the tip of the marginal cell, the posterior branch curved backward ending beyond the tip of the wing; posterior cells long; hind margin of the discal cell nearly one-half the length of the outward continuation of the vein, the first section of the anterior border nearly one-fourth the length of the second section.

Seven males, one female; Idaho, Oregon.

Empis mixopolia sp. nov.

Male and Female.—Rather stout small species of gray-brown color. Palpi infuscated more or less at the base, and with one distinct preapical bristle beneath; first antennal joint once and a half the length of the second joint, the third joint comparatively small; occipital bristles moderately long, in two well-defined rows. Thorax gray, more or less olivaceous on the dorsum and with the vittæ brown. scutellum gray, provided with four marginal bristles; the bristles of the pronotal collar long; a small bunch of hairs present on each side of the pectus; about ten uneven bristles in front of the halteres; between the four macrochætæ above the base of the wing and the humeral macrochætæ at most but three minute bristles on the margin of the mesonotum, the humeri with few minute bristles; abdomen with small bristles towards the base; middle lamellæ of the hypopygium yellowish at the extreme tip, not entirely concealing the upper lamellæ; the whole of the thickened base of the central filament exposed; hairs of the hypopygium short. Coxæ darkened at the base, their hairs minute; legs robust, short, reddish, the tarsi and the upper side of the femora blackened; the bristles of the outer side of the tibiæ strong, uniformly widely distant (*i. e.*, six on

each side of the well-marked median glabrous streak); none of the metatarsi enlarged, the hind tarsi stoutest; hind femora distinctly bowed, hind tibiæ somewhat bent; hind femora of the male beneath with a single preapical flat tubercle which is tipped at its outer corner with a short pencil of black hairs, between this projection and the tip of the femur is a black fringe on each side beneath, the outer one containing only three minute hairs closely placed, the inner one conspicuous, consisting of four long, stout bristles, and as many hairs; the hind tibiæ of the male stout, with two prominent basal tubercles, one on each side of the median line and one in advance of the other, the more basal (on the inner side) capped by a pencil of black hairs, the other with a dense short brush. Wings clear hyaline, the third vein furcate just beyond the end of the marginal cell, its posterior branch ending at the extreme wing-tip or slightly in advance; the first section of the front border of the discal cell one-third to one-fourth the length of the outward continuation of that vein; the third vein turns slightly upward, leaving the first posterior cell distinctly wider than the first submarginal. 5 mm.

Numerous specimens from Idaho, collected by Prof. J. M. Aldrich.

Empis æripes sp. nov. (Fig. 141).

Female. Length 7.5 mm.—Stout species covered with whitish gray pollen. Antennæ stout, first joint two times the second; palpi strongly infuscated, except the apex, provided with numerous minute hairs below; occipital bristles strong and dense; pronotal, pectal, humeral and coxal bristles prominent; scutellum with eight to ten bristles, four to six short and four long, alternating, the central pair long; in front of the halteres is a cluster of about nine bristles. Thoracic vittæ narrow, faint, not at all brownish, but nearly concolorous with the rest of the body. Legs stout, dark fuscous, femora above, hind tibiæ apically and tarsi blackish; hind femora and tibiæ bent, the tibial bristles stout. Wings nearly clear, the very faint stigmal spot extremely narrow, veins blackish, clear-cut, the third vein sinuous, furcate beyond the tip of the marginal cell, the posterior branch terminating before the wing-tip, the first section of the front margin of the discal cell one-fourth the length of the second section, the posterior border two-thirds the length of the vein between the third and the fourth posterior cells.

Male.—Differing from the female very markedly in the color of the pollinose coating which is not pure gray but mixed with brown. The vittæ are brown and diffuse into the intervittal spaces. The armament of the legs is very similar to that of *mixopolia*, but is carried to a greater extent; the apical fringe of the lower inner side of the hind femora contains about ten strong bristles besides the four hairs; the more distal tubercle of the tibia is longer.

This, together with the preceding species, differs from all the other species of *Empis* in the structure of the armament of the male hind knees. It is distinct, however, from *mixopolia*, being a much larger and more robust form. The black color of the whole coxa, the numerous scutellar and other bristles, the larger discal cell and diffused vittæ of the thorax, the lateral ones of which are not so much abbreviated as in *mixopolia*, and the specialized

structure of the hind legs readily separate this form from the preceding.

The collection contains numerous specimens of both sexes taken in Idaho, by Prof. J. M. Aldrich.

EMPIMORPHA Coquillett.

Same as *Empis*, except that the face is covered with long bristly hairs; antennal style apical, proboscis directed downward, longer than the height of the head; third vein forked; discal cell perfect, sending three veins to the wing margin; anal cell shorter than the second basal, the vein at its apex nearly parallel with the hind margin of the wing.

Pile in front of the halteres and on the sides of the abdomen black.....2.
Pile in front of the halteres and on the sides of the abdomen whitish.
comantis Coquillett.

2. Palpi, proboscis, legs and halteres largely reddish.....**barbata** Loew.
Palpi, proboscis, legs and halteres black .....**geneatis** sp. nov.

Empimorpha barbata Loew (Fig. 106).

Empis barbata Loew, Cent. ii, 19.

Head black, with long black pile. Eyes large, subcontiguous (male). First two joints of the black antennæ clothed with long black pile. Face bearded with black pile. Palpi large, badious, with black pile. Proboscis very long, much thickened at base. Thoracic dorsum black, opaque, black-pilose, with three cinereous vittæ, the median narrow, the outer ones broad. Pleuræ black, with cinereous-yellow pollen, bare, except for the bunch of black hairs in front of the halteres. Abdomen black, subshining, opaque, towards the sides with cinereous pollen, and provided with long black hairs. Hypopygium small, black-pilose, the lower lamellæ large, ovate, the middle filament short, awl-shaped. Legs badious, with black hair, the extreme tip of the tibiæ and the tarsi black, but the metatarsi, except the apex, and the base of the next few joints badious. Wings long, rather narrow towards the apex, fuscous, the costal cell ferruginous. 9 mm.

California.

Empimorpha geneatis sp. nov. (Fig. 105).

Male. Length 6.5 mm.—Black, occiput, pleuræ and coxæ lightly and finely gray-pollinose. Eyes contiguous above the antennæ; face, sides of occiput, cheeks, palpi and upper side of the first antennal joint bearing very many long black hairs. Antennæ one-fourth longer than the height of the head, slender, black, first joint equalling one-third the length of the antenna, second joint and style short. Dorsum of thorax black, opaque, with two faint gray vittæ; very sparingly hairy, a longer bunch of black hairs above the root of the wings; margin of scutellum with about fourteen hairs; a bunch of black hairs present between base of the wings and the halteres. Sides of first three abdominal seg-

ments with black hairs, remainder of tergum nude (the venter is eaten off by parasites); hypopygium small, not constricted at base, black, from the under side projects a small curved process, upper valves short-hairy. Legs piceous, with black hairs, especially on front side of the coxæ, and upper and under sides of the front and middle femora and tibiæ; hind legs gradually thickened, hind tarsal joints swollen, remainder of legs slender, simple. Halteres piceous. Wings cinereous-hyaline, stigma faintly fuscous, veins dark brown.

One male; California (Baron).

Empimorpha comantis Coquillett.

Proc. Nat. Mus., 1895, p. 396.

Head black, gray pollinose; pile of face mixed with black and white; eyes narrowly separated, the space between them being narrower than the width of the lowest ocellus, the upper facets being noticeably larger than the lower ones; antennæ black, the second joint reddish, slightly over one-third as long as the first; third joint subequal to the first, twice as long as broad; style slender, as long as the third joint; proboscis two and one-half times as long as the height of the head, projecting obliquely downward; palpi slender, curving upward, yellowish, the base brown, the pile black and white. Thorax black, shining, three vittæ and the broad lateral margins opaque gray pollinose; pile of thorax very abundant whitish, two longitudinal stripes of largely black pile on the dorsum; pleura black, thickly whitish pilose, destitute of stout bristles. Abdomen shining black, depressed, twice as long as wide; its pile very abundant, on the first two segments and the sides of the others largely whitish, on dorsum of the remaining segments mostly black; legs rather robust, reddish yellow; coxæ, under side of each femur, apex of each tibia and of each tarsal joint blackish; legs simple, the pile abundant. Halteres black. Wings hyaline, grayish towards the apex; veins, stigma and a spot above furcation of second and third veins dark brown. The female is the same as the above, except that the first abdominal segment and the bases of the next two are opaque gray pollinose. 11 mm.

Northern California (C. Fuchs).

PACHYMERIA Macquart.

Sparsely hairy species of stout aspect and gray-black color, very much resembling *Empis*. This genus grades into *Empis* and *Rhamphomyia*, but differs in that both sexes are dichoptic, that all the femora are about equal in length, and that the hind femora are strongly thickened.

Abdomen black, with white pollinose spots towards the apex . . . **pudica** Loew.
Abdomen unicolorous black . . . . . **brevis** Loew.

Pachymeria pudica Loew.

Cent. i, 35.

Head dark cinereous. Antennæ black, first two joints cinerascent, sometimes partly fuscous. Proboscis very long. Thorax 4-vittate with fuscous, with short and sparse black hairs. Abdomen short, broad, black, shining, subglabrous, with fine pale hairs, longer at the base and at the basal part of the lateral margins;

last abdominal segment almost completely white-pollinose; the preceding segments marked on each side with a white-pollinose spot, very large in the female, but smaller and not reaching the posterior margins of the segments in the male. Hypopygium small; the upper appendages changed from lamellæ to small, swollen, ovate, dusky yellow, very short and very finely pubescent bodies; filament concealed. Coxæ dusky gray, yellowish towards apex; femora black, apically badious, sometimes wholly badious, below marked with a large black spot; tibiæ testaceous, base often broadly badious; tarsi testaceous, last joint black. Halteres whitish. Wings very pale cinerascent, veins fuscous. 5 mm.

District of Columbia (Osten Sacken).

Pachymeria brevis Loew.

Cent. ii, 22.

Head black, cinereous with pale pollen, occiput black-pilose. Antennæ black. Dorsum of thorax cinereous with pale pollen, very faintly sub-vittate, provided with rigid hairs and black macrochætæ. Scutellum concolorous with the thorax, with four marginal black bristles. Pleuræ black, cinereo-pollinose, and black-pilose. Abdomen rather broad, sub-depressed, black, and black-pilose. Hypopygium small, compressed, black, the lower lamellæ ovate, the central filament pale yellow, low, arcuate. Coxæ black, cinereo-pollinose, black-pilose. Wings cinerascent, veins fuscous. 4.2 mm.

District of Columbia (Osten Sacken).

ITEAPHILA Zetterstedt.

Small, blackish, rather thickly pubescent, *Empis*-like species. Antennæ longer than the head, plainly three-jointed, basal joints short, with erect hairs, last joint oval, bare, with a very short arista. Proboscis as long (female) or longer than the head, rather thick, horizontal, palpi lengthened. Eyes of male contiguous, of the female widely separated. The male abdomen small, with projecting anal appendages. Legs slender, simple. Wings with the third vein forked, the upper branch reaching straight to the costa; discal cell present, with three apical veins; anal cell shorter than the second basal, both bounded by a cross-vein almost parallel with the hind margin; anal angle strong.

Iteaphila Macquarti Zeterstedt.

Ins. Lapponica, 541, i.

Black, or piceous. Thoracic dorsum indistinctly vittate. Halteres black. Legs black with reddish knees. Wings brownish (male) or hyaline (female) with the veins plainly bordered with brown. 4 mm.

New Hampshire, Quebec.

Iteaphila perigrina sp. nov. (Fig. 97).

Length 3 mm.—Black, abdomen more or less piceous, feebly dusted and therefore sub-shining, provided with sparse, slender hairs; eyes of the male broadly

contiguous, their facets large, the lowest ones smaller, eyes of the female separated more widely than the ocelli, their facets as large as the smallest of the male; face of nearly uniform breadth. Proboscis very slender, extending straight forward, nearly one and one-half times the height of the head; palpi prominent, slender, extending beyond the epistome. Antennæ black, short, the basal joints short and thick, the third joint lanceolate, robust, the stout arista one-third the length of the third joint. Occiput with slender hairs. Thoracic dorsum evittate, but with the dorsicentral bristles prominent; scutellum with four slender bristles. Abdomen slender, long; hypopygium small, terminal, widely open. Legs very slender, simple, fuscous, the posterior tibiæ gradually and slightly thickened towards the apex; all the tibiæ provided with small terminal spurs; tarsi slender not spinose below. Halteres infuscated. Wings lightly infumated in the male, and clear hyaline in the female, veins narrow, fuscous, stigma indefinite; the furcation of the third vein acute, taking place beyond the tip of the marginal cell, sixth vein evanescent.

Seven specimens; San Diego Co., California (Wm. M. Wheeler).

This species, while differing from the typical *Iteaphila* by its very slender proboscis, is not a true *Empis*, and had best be included here.

MICROPHORUS Macquart.

Small, black, moderately hairy species. Of the European forms the antennæ are as long as the head, apparently two-jointed, with a short two-jointed arista; proboscis short, not projecting forward; palpi cylindrical; eyes bare, of both sexes separated, but approximate. Thorax hunchbacked. Abdomen of male blunt at the end, of the female pointed. Legs slender, bristly, the hind ones lengthened, tibiæ sometimes thickened apically. Third vein unforked; discal cell with three apical veins; anal cell shorter than the second basal cell, both bounded by one cross-vein, extending almost parallel with the hind margin; anal vein obsolete; anal angle almost rectangular.

Since Walker was familiar with at least one European species of *Microphorus*, *drapetoides* is left in the genus as given in its European sense. However, his selection for the specific name is not descriptive of the other species, and therefore his species probably does not conform with the characterization above given. The diagnosis is too meagre to allow any certainty to be placed on Mr. Walker's determination, and thus the location of *drapetoides* in the present genus is mere conjecture.

Microphorus drapetoides Walker.

List Dipt. Ins., iii, 489.

Body black, hairy; eyes piceous; feelers and lip black, the latter short; legs

piceous, clothed with short black hairs; wings dark brown, slightly tawny along part of the fore border from the base; wing-ribs and veins piceous. 2.5 mm.

St. Martin's Falls, Albany River, Hudson's Bay.

HOLOCLERA Schiner.

Small, nearly bare species of black coloration. The antennæ elongate, with the first joint minute, the third lengthened, lanceolate or attenuate, with an elongate style. Proboscis slender, horizontal. Eyes of the male contiguous. Thorax greatly hunchbacked. Male genitalia prominent, in our species pedunculate and flexed to the right. Legs more or less ciliated with fine hairs; the hind tibiæ and metatarsi thickened. Wings short and broad, with a simple third vein; discal cell emitting three veins; anal cell rounded, the anal vein not continued; anal angle rectangular, very prominent.

A genus previously unrecognized on this continent.

Body opaque gray pruinose ..... **ravida** Coquillett.
Body not conspicuously gray pollinose ..... 2.
2. Thorax bilineate; halteres whitish ..... **bilineata** sp. nov.
Thorax evenly dusted; halteres black ..... 3.
3. Under side of front femora devoid of cilia; wings infumated; stigma indistinct. **sycophantor** sp. nov.
Under side of all the femora ciliate; wings clear hyaline; stigma distinct. **atrata** Coquillett.

Holocera ravida Coquillett.

Microphorus ravidus Coquillett, Proc. Nat. Mus., 1895, p. 409.

Black, only the halteres whitish. Eyes contiguous, third antennal joint elongate, conical, the apical style slightly longer than the third joint; probosis nearly perpendicular, from two-thirds as long to as long as the height of the head. Thorax, pleuræ, scutellum, and abdomen opaque gray pollinose, the bristles black, scutellum bearing four bristles; hypopygium rather large, bent around against the right side of the abdomen. Wings grayish hyaline, slightly smoky along the veins, stigma and veins brown, no vein issues from the anal cell; this cell is nearly as long as the second basal, the vein at its apex arcuate and not parallel with the hind margin of the wing. 2 mm.

The female differs from this in having the eyes broadly separated and the abdomen very blunt at the apex.

Southern California.

Holoclera atrata Coquillett.

Microphorus atratus, Proc. Wash. Acad. Sci., 1901, p. 412.

Black, including the hairs; eyes of male contiguous, the third joint of antennæ orbicular on its basal half, the remainder narrowed into a styliform process, style one and one-half times as long as the third antennal joint, proboscis less than half

as long as height of the head, body opaque, not pruinose, the hairs rather long, on the mesonotum abundant, on the abdomen sparse, scutellum bearing four bristles; under side of front and middle femora, both sides of the hind ones and outer side of hind tibiæ ciliate nearly their entire length with rather long hairs, first joint of hind tarsi noticeably thicker than that of either of the other tarsi, much narrower than the hind tibiæ; wings hyaline, veins and stigma brown, venation normal, last section of fifth vein two-thirds as long as the preceding section, sixth vein obsolete beyond end of anal cell. 2 mm.

Alaska.

Holoclera bilineata sp. nov. (Fig. 99).

Length 1.75 mm.—Black, covered with dark olivaceous gray dust. Eyes large, broadly contiguous, facets small. Antennæ one-half the eye-height, first joint invisible, third joint lanceolate, the style two-thirds as long as the third joint. Proboscis very short, horizontal, hairy beneath; palpi short, black. Thorax remarkably hunchbacked, the dust obliterated on the dorsum along two narrow vittæ, but bounding these becoming black; mesonotal bristles black, dense, short in front; scutellum with about six marginal bristles. Hairs of abdomen fine, yellow; hypopygium smaller than in the preceding species, pedunculate and flexed to the right, its parts not visible. Legs, including tip of coxæ yellowish-brown, middle femora with a few apical cilia below, hind femora ciliate above and hind tibiæ outwardly; hind tibiæ enlarged and compressed, hind metatarsi distinctly enlarged, but not nearly as much so as the tibiæ, as long as the three following joints only. Halteres yellowish. Wings clear hyaline, veins narrow, an elliptical brown stigma present; the vein between the discal cell and the third posterior three times that between the discal and the second posterior cells; the hind margin of the discal cell sub-equal to its prolongation.

Nine males; Opelousas, La. (G. R. Pilate).

Holoclera sycophantor sp. nov.

Length 2 mm.—Wholly black, opaque, dusted with dark olivaceous. Eyes large, broadly contiguous on the front, facets small. Antennæ short, apparently two-jointed as the first joint is minute; third joint broad at the base then suddenly attenuate and lengthened, its style slender, one-half the length of the third joint. Proboscis shorter than the length of the head, horizontal; palpi conspicuous, black-bristly, porrect also. Occiput regularly ciliate with close bristles. Thorax sparsely black-bristly, the bristles long; scutellum with four bristles. Abdomen cylindrical, covered with long black bristles; hypopygium large, flexed toward the right, the central filament exposed at the tip, horizontal, piceous. Legs moderately short, especially the anterior pairs, stoutish, black, the upper side of all the femora, the lower side of the hind ones (and sparsely so on the middle ones), the outer side of all the tibiæ, especially the hind ones, ciliate with black hairs; hind tibiæ enlarged apically, but compressed; hind metatarsi a little larger than the other joints but of less length than the rest of the tarsus taken together. Halteres infuscated. Wings smoky, veins dark, stigma indistinct; the outward boundaries of the discal cell sub-equal.

Eight males; Idaho (Prof. J. M. Aldrich).

It may be noticed that only males of this genus have so far been taken in North America.

CYRTOMA Meigen.

Small, finely hairy species. Antennæ shorter than the head, apparently two-jointed, outer joint lanceolate or ovate, with a short end bristle. Proboscis short. Eyes bare, contiguous above. Thorax prominent, abdomen lengthened. Legs slender, posterior pair lengthened, with the tibiæ thickened apically; hind metatarsi long and more or less thickened. Wings with a simple third vein, no discal cell, three veins arise in the middle of the wing ending in the margin; anal cell shorter than the second basal, both bounded by a vein almost parallel with the hind margin; anal angle rectangular, prominent.

Hind femora incrassate, hybotine-like species, hind tibiæ yellowish at base....2.
Hind femora not incrassate, empidine-like species, legs black.....3.
2. Species measuring three millimeters, hind tibiæ three-fourth the length of their femora.....**femorata** Loew.
More than four millimeters long, hind tibiæ five-sixths the length of their femora.....**procera** Loew.
3. Halteres whitish, pile of abdomen dull whitish.....**halteralis** Loew.
Halteres blackish, pile of abdomen black in part.....4.
4. Legs moderately pilose, slender and piceous.....**longipes** Loew.
Legs strongly pilose, robust and jet black.....**pilipes** Loew.

Cyrtoma femorata Loew.

Cent. v, 69.

Black, antennæ concolorous, third joint lanceolate. Thorax cinereo-pollinose. Pile of thorax and scutellum sparse, black. Abdomen shining, with scattered white pile; segments on the front half obsoletely cinereo-pollinose. Legs long, black, black pilose, tips of the coxæ and the knees testaceous; hind femora thickened; front tibiæ rather stout; hind tibiæ thick, truncate, luteous, towards the tip black. Halteres whitish. Wings fusco-cinereous, veins fuscous, stigma obsoletely subfuscous. 3 mm.

New Hampshire (Osten Sacken).

Cyrtoma procera Loew.

Cent. v, 70.

Black, antennæ concolorous, third joint broad and ovate basally, slender apically. Thorax lightly cinereo-pollinose, its pile black. Abdomen shining, with scattered white pile. Legs long, black, black-pilose, apex of the coxæ and the knees luteous; hind femora incrassate; front tibiæ hardly thickened basally; hind tibiæ thick, obliquely truncate, luteous, towards tip black. Halteres whitish. Wings fusco-cinereous, veins fuscous, stigma obsoletely subfuscous. 4.5 mm.

Sitka, Alaska (Kolenati).

Cyrtoma halteralis Loew.

Cent. ii, 46.

Wholly black, somewhat shining. Pile of thorax and scutellum either wholly

or in part black, that of abdomen dirty white. Apically the hind tibiæ slightly incrassate. Halteres whitish. Wings pale fuscous, stigma saturate fuscous. 2.2 mm.

District of Columbia (Osten Sacken), Wisconsin (Wheeler).

Cyrtoma longipes Loew (Fig. 71).

Cent. ii, 47.

Wholly black, shining. Pile of the thorax and of the scutellum black. Pile of abdomen above black, along sides and beneath pale; abdomen of male above opaque. Legs longer and more slender than usual, moderately pilose, hind tibiæ somewhat thickened apically. Halteres dark brown. Wings blackish. 2.6 mm.

Massachusetts, New Hampshire, Wisconsin, Illinois, Wyoming, New Mexico.

Cyrtoma pilipes Loew.

Cent. ii, 48.

Black, shining. The pile of the thorax and scutellum, and partly that of the abdomen black. Legs rather strong and closely black-pilose, hind tibiæ a little thickened, especially apically. Halteres black; wings blackish. 3 mm.

Illinois (Le Baron), Alaska (Kincaid).

MYTHICOMYINÆ.

HILAROMORPHA Schiner.

Although *Hilaromorpha* has been assigned to the Leptidæ by most writers, it is included in the present paper mainly because in the tables of the only complete Manual of the North American Diptera, that of Dr. Williston, specimens of the genus would run to the Empididæ, and not because it is any firm belief of the writer that *Hilaromorpha* can be an Empid, and only an Empid.

Small, bare species of blackish gray color. Antennæ three-jointed, the first two joints short, the third lengthened, broad, toward the end suddenly narrowed, with a short two-jointed bristle. Proboscis short, projecting slightly; labellæ broad; palpi two-jointed, strongly thickened at the end, lamellate, as long as the proboscis. Eyes of the male contiguous on the front, of the female separated by the front. Three ocelli. Thorax strongly arched; abdomen arched posteriorly, transversely wrinkled, in both sexes pointed, in the males the projecting genitalia are attached to the small end of the abdomen; these consist of broad claw-like side pieces, which are brought together to form a thick, globose body. Legs slender, the hind ones somewhat lengthened. The third and fourth veins of the wing forked; discal cell wanting; anal cell broad up to the wing-margin, closed. Anal angle well-developed.

Legs black, except the yellowish knees.....**obscura** Bigot.
Legs yellow, except the darkened tarsi .....**Mikii** Williston.

Hilaromorpha obscura Bigot.

Bull. Soc. Ent. France (6), vii (1887), p. cxl.
Ann. Ent. Soc. France, 1889, p. 129.

Entirely of an opaque black, except the yellowish knees; venter pruinose, and of a dark gray color; wings infumated, darker along the outer border, with an elongated, diffused, blackish stigma. 5 mm.

California.

Hilaromorpha Mikii Williston.

Psyche, 1888, p. 100.

Male.—Face opaque gray, with grooves from the oral margin. Antennæ brownish yellow; the third joint oval, a little longer than broad, the anterior borders straight or gently concave to the insertion of the slender two-jointed style, which is nearly as long as the body of the joint. Thorax in ground color black, thickly covered with opaque yellowish pollen on the mesonotum; on the pleuræ with lighter, less dense pollen. Abdomen with each segment anteriorly brownish black; posteriorly banded with opaque yellow, of a color somewhat lighter than that of the mesonotum. Legs yellow, the terminal joints of the tarsi infuscated. Wings blackish, a little lighter behind. 4 mm.

Carlinville, Illinois (Robertson).

MYTHICOMYIA Coquillett.

Body with no macrochætæ. Head globular, attached to a distinct neck. Antennæ porrect, two-thirds the height of the head, the first joint very short, the second as broad as long; the third broad, lanceolate, not annulate. nearly three times the second; style terminal, nearly one half as long and one third as broad as the third joint, very densely pubescent. Eyes of the male contiguous, and with an area of enlarged facets above. Three widely separated, equidistant ocelli present. Proboscis rigid, nearly as long as the head height, directed obliquely forward, no labellæ; palpi minute. Thorax greatly arched, in profile higher than long. Wings with the marginal cell closed, only one submarginal cell and four posterior cells, all open, as is also the anal cell; first section of the fourth vein colorless, the last (seventh vein) very weak. Legs rather stout, but none of the parts dilated, with no bristles, spines or other processes; front coxæ less than one half the length of the femora; pulvilli well developed, empodium bristle-like.

Tibiæ, halteres, first vein and second section of the costa yellow.
Rileyi Coquillett.

Tibiæ, except at base, black; upper side of knob of halteres also black; first vein and costa brown.....**tibialis** Coquillett.

Mythicomyia Rileyi Coquillett.

Ent. News, 1893, p. 209.

Black, the frontal triangle, face, humeri, base of the first and apices of the other abdominal segments, excepting the last, apex of femora, tibiæ wholly, and the halteres white, the short sparse hairs also white; occiput, thorax and abdomen gray pollinose, the hypopygium shining, one and one-third times as high as long, shorter than but projecting one-fourth its height above the eighth abdominal segment. Wings wholly hyaline. 2.5 mm.

California; Mesilla Park, New Mexico (T. D. A. Cockerell).

Mythicomyia tibialis Coquillett.

Proc. Nat. Mus., 1895, p. 409.

Male.—Black, frontal triangle, face, cheeks, humeri and each hind corner of the thorax whitish; halteres, except upper side of the knob, hypopygium largely, knees and base of hind metatarsi yellowish. Head, sides of thorax, pleura and scutellum gray pollinose, abdomen deep velvet black; pile of head and body whitish. Wings wholly hyaline, veins black, the auxiliary and bases of the other veins yellowish. On the under side of the hind metatarsi, before its middle, is a rounded notch, in front of which is a round process. 3.5 mm.

Los Angeles Co., Calif. (Coquillett).

ADDITIONAL NOTES AND DESCRIPTIONS.

During the time the foregoing pages have been going through the press a number of additions have been made resulting from the courtesies of several gentlemen. Through the kindness of Mr. Samuel Henshaw the types of this family described by Dr. H. Loew have been examined at Cambridge, which has introduced a number of synonymical changes and brought to light several previously undescribed species. Charles W. Johnson, J. Chester Bradley and George M. Greene have each contributed to our knowledge of this family since the first collection was amassed. But the most important of the following additions are the result of an expedition to New Mexico during May and June of this year, undertaken by James A. G. Rehn and Henry L. Viereck, under the direction of the Philadelphia Academy of Natural Sciences. During one month's time, Mr. Viereck collected twenty-three species of Empididæ of which only eleven were previously described. The twelve other forms are included among the new species given in the main paper or are described below. I wish to thank Miss Mabel Evans also for her assistance in reading the proof of this article.

Page 205. **STILPON.**

Sides of front and vertex nearly parallel; hind metatarsi thickened and darkened ..... 2.
Vertex broadened; hind metatarsi not thickened ..... 3.
2. Veins bordered with brown; abdomen brick-red..... **varipes** Loew.
Veins not bordered; abdomen blackish..... **pectinger** mihi.
3. Thorax closely pollinose; first vein ending at middle of wing.
Houghii mihi.
Thorax shining; first vein ending before middle of wing..... 4.
4. Legs yellowish; basal cells equal, small..... **minuta** sp. nov.
Legs black; second basal cell larger..... **nigripes** sp. nov.

Stilpon nigripes sp. nov.

Male and Female. Length 1 mm.—Black species. Eyes nearly contiguous on the face and just above the antennæ; vertex broadened. Proboscis short, incurved, black, palpi blackish, with dusky hairs. Antennæ black, the outer joint short ovate, rather pointed, not larger than the inner joint, the long seta subterminal. Thorax shining black, the sparse pubescence dusky, appressed, scutellum with two long and two short bristles. Abdomen subopaque, black, hypopygium large, gaping, the upper valve ascending, hood-shaped, shining, the lower portion pedunculate, projecting, provided with many short bristly hairs on the outer portion, a curved central exserted penis present. Legs black, short, robust, all the femora moderately thickened, no swellings nor ciliation. Halteres black. Wings clear hyaline, veins black, first vein much stronger than the others, ending at middle of costa, second vein ending midway between first and third, third and fourth veins parallel, fifth vein ending opposite the second vein, second basal cell broad and one-half longer than the first, its cross-vein nearly perpendicular.

One male and nine females. Alamogordo (Middle Sonoran); Highrolls (Upper Sonoran), and Cloudcroft (Canadian Zone), New Mexico. May and June, 1902. (H. L. Viereck.)

Stilpon minuta sp. nov.

Female. Length 1 mm.—Black, shining species, with yellow legs. Eyes contiguous just below and above the antennæ, front narrow, sides diverging, vertex broad, triangular. Antennæ dusky, the outer joint short, oval, the long seta subdorsal. Proboscis short, incurved, black, palpi small yellowish. Thorax and abdomen shining, their sparse hairs dusky, scutellum with two long and two shorter bristles. Legs including the coxæ dusky yellow, simple, not fringed, femora but little thickened. Halteres dusky. Wings hyaline, unspotted, veins dark fuscous, uniform, the second vein ends at the middle of the costa, second section of the costa about one-half the length of the third, third and fourth veins gradually diverging, basal cells short, equal, posterior cross-vein oblique, fifth vein ends beyond the second vein.

Three females; Cloudcroft and Highrolls, New Mexico. June, 1902. (H. L. Viereck.)

Page 207. **Drapetis nitida** mihi.

Is the same as *unipila* Loew.

Page 210. **Drapetis pubescens** Loew.

The basal cells are large for this genus.

Page 212. **Drapetis spectabilis** mihi.

In the collection of the Museum of Comparative Zoology at Cambridge are three specimens from Bosque Co., Texas (Belfrage).

Drapetis xanthopodus Williston.

Is the same as *gilvipes* Loew.

Page 214. **Platypalpus lupatus** sp. nov.

Male. Length 2.5 mm.—Black species, head and thorax overlaid with hair-like tomentum. Face white. Antennæ black, the outer joint oval, its style two and a half times its length. Proboscis black. Bristles of body and of legs dirty white. scutellum with two long and two short bristles. The glabrous space of the mesopleuræ small. Abdomen and hypopygium shining black, the latter twisted to the right, the basal edge of the under side with several long black hairs. Coxæ black, piceous apically; legs black, except towards the trochanters and knees, the hind tibiæ and the bases of the tarsal joints, which places are dull yellowish; front femora thickened as much as the middle ones, front tibiæ stouter than the middle ones, middle tibiæ with a strong apical spur, remainder of legs simple; legs with scattered yellowish hairs, longer beneath on the femora, front tibiæ with about ten longer hairs on the front edge, the hairs gradually becoming long below and not arranged in a definite series. Halteres yellow. Wings hyaline, veins fuscous, third vein straight, fourth vein slightly sinuous, subparallel with the third and slightly diverging from it at the tip, second basal cell the longer, its cross-vein oblique, the distance between the two cross-veins on the fourth vein less than the length of the anterior cross-vein, anal cross-vein straight, inflexed, evanescent, anal vein faint, obsolete at base.

One male; Cloudcroft, New Mexico. May 27, 1902. (H. L. Viereck.)

This species is associated with the eastern *pachycnemus*, but in that form the antennæ are dark fuscous, the front femora but slightly thickened, the third vein incurved, converging with the fourth, while along the fore edge of the front tibiæ there is a series of but seven hairs, with a similar series also on the hinder edge. The hairs of the inner edge are finer and number eight. *Pachycnemus* measures 2.3 mm.

Platypalpus Viereckii sp. nov.

Male and Female. Length 2.5 mm.—Black pollinose species, with yellow legs. Face and front whitish, occiput cinereous, beneath with dense white hairs. Antennæ yellowish, extreme tip of the outer joint and the arista dusky, outer joint lanceolate, the arista but little longer than the antenna. Proboscis black, palpi prominent, yellow. Thorax with golden dust above, becoming cinereous on pleuræ, a small shining space present above the middle coxæ; bristles yellow, scutel-

lum with two moderately long and two short bristles. Abdomen dusted with gray, hypopygium small, black, terminal, not pollinose, upper piece with a close fringe of yellow bristles on the left side. Legs including coxæ pale yellow, tarsi strongly annulate with black, spur of middle tibiæ prominent, black, front femora nearly as thick as middle ones, fringed beneath with white cilia, middle femora and tibiæ with a double series of minute setulæ on under surface, front tibiæ slightly bowed and incrassate. Halteres whitish. Wings yellowish, veins yellow, anal vein obsolete at base, distance between the two cross-veins on the fourth vein somewhat greater than the length of the first cross-vein, second basal cell the longer, its cross-vein oblique, third and fourth veins parallel.

Var.—Ground color of abdomen becoming yellow.

Numerous specimens, the males predominating. Cloudcroft, New Mexico, May 27, 1902. H. L. Viereck, collector.

This species will run to *crassifemoris* in the table on page 215, *anteâ*, but is sufficiently differentiated by its pollinose abdomen. Only two other of the previously described species of *Platypalpus* (*canus* and *incurvus*) have the abdomen pollinose, but as both of these have black antennæ the present form can be quickly recognized. The following species should also be compared.

Platypalpus rufiventris sp. nov.

Male and Female. Length 2-2.5 mm.—Thorax black, gray dusted, abdomen testaceous, lightly dusted, subshining. Face and front whitish, occiput cinereous. Antennæ black, short, outer joint short, ovate, pointed, its bristle twice its length. Thoracic notum and abdomen with yellowish tomentum, pleuræ cinereous, the usual shining spot overlaid with pollen also, bristles yellow, scutellum with two moderate bristles. Abdomen lightly dusted, less so in the female, in the male dusky at the base, in the female reddish yellow, hypopygium small, blackish, with a few long yellow hairs extending laterally from the left side. Legs including the coxæ yellow, tarsi not annulate, their very tip dusky, spur of middle tibiæ black, front tibiæ not incrassate, front femora half as thick as the middle ones. Halteres yellow; wings as in *Vierecki*.

One male, seven females; Cloudcroft, New Mexico. June 17, 1902. (H. L. Viereck).

This and the variety of the preceding species are the only North American species of *Platypalpus* known with black thorax and red abdomen. It can be quickly distinguished from *Vierecki* by the shape and color of the antennæ, and by the uniform tarsal coloration.

Page 219. **Platypalpus lætus** Loew.

The tibial spur is as large as usual for this genus. The apices of the tarsal joints are scarcely darker than the rest. The third and fourth veins gently converge before the tip of the wing and then continue subparallel.

Platypalpus flavirostris Loew.

Loew's type specimen has four narrow dusky vittæ on the castaneous thoracic notum. Another female from the Osten Sacken collection is somewhat smaller and has no dark vittæ. The ground color of the head is black.

Page 222. **Platypalpus discifer** Loew.

The middle tarsi of the male are greatly enlargened and flattened, and feathered along the edge with close black scale-like hairs.

The species *trivialis*, *æqualis* and *crassifemoris* of *Platypalpus* are all quite similar, and probably represent one extremely variable species. The characters chosen in the table will render the divisions somewhat homogeneous, but too much stress must not be laid on the infalibity of the separation. The species as defined in this way do not conform exactly with those Dr. Loew had in mind.

Page 225. **TACHYDROMIA.**

Modify table as follows:

10. Wings with a black spot at outer third of costal margin. **maculipennis** Walker.
Wings infumated, except the whitish base.....10*a*.
10*a*. Anal cross-vein wanting.....11.
Anal cross-vein present.....11*a*.
11. Legs black; second basal cell shorter than first.....**nubifera** Coquillett.
Legs more or less yellowish; second basal longer than first..**pusilla** Loew.
11*a*. Front tibiæ strongly incrassate; first basal cross-vein oblique, second perpendicular.....**clavipes** Loew.
Front tibiæ not greatly thickened.....12.
12. Second basal cell but little exceeding the first, its cross-vein perpendicular; proboscis reddish at base.....13.
Second basal cell longer than the first by at least the length of its oblique cross-vein; proboscis black; pleuræ shining.....**rapax** Loew.
13. Pleuræ shining; front tibiæ with no teeth below; middle femora more slender than front ones; eastern species.....13*a*.
Pleuræ opaque; front tibiæ closely mucronate with black setulæ below; middle femora as thick as the front ones; western species. **corticalis** sp. nov.
13*a*. Front femora bare beneath; hypopygium without bristles. **rostrata** Loew.
Front femora ciliate beneath; hypopygium with long black bristles above. **brachialis** sp. nov.

Tachydromia nubifera Coquillett.

Fur Seals and Fur Seal Islands of N. Pacif. Ocean, 1898, iv, p. 343.

Male and Female.—Black, the bases of the halteres yellow; hairs and bristles

black; head and thorax subopaque gray pruinose. Third joint of the antennæ oval, only slightly longer than the second. Wings grayish hyaline, the costal portion beyond the base of the submarginal cell extending from the costa to the fourth vein brown, the limits not sharply defined, second basal cell slightly shorter than the first, anal cell wholly wanting. Front femora only slightly thicker than the others. 3-4 mm.

Behring Island (Stejniger).

Tachydromia corticalis sp. nov.

Male. Length 3.5 mm.—Black species covered with fine brown gray dust. Occiput grayish, with a few black bristles above and numerous white hairs below; front brownish. Antennæ yellow at the base, the outer joint and its seta infuscated. Proboscis reddish, with the tip darkened; palpi white, with a strong black preapical hair. Thoracic notum covered with brown-gray dust, the large humeri, the pleuræ and scutellum with more cinereous dust, scutellum with two erect widely separated bristles. Abdomen flattened, hypopygium large, shining black, globose, the copulatory portion twisted to the right, asymmetrical, consisting mainly of two large lamellate pointed valves, the one on the right with a bunch of short black hairs on its upper side, clasping a complicated short central piece bearing a short fringe of forward extending hairs, the last ventral is provided with a series of long black hairs. Coxæ and legs shining, piceous, front ones lighter, the four anterior femora swollen, of nearly equal thickness, front femora unarmed, ornate with two circular black spots on inner side below, one at the middle, the other half-way towards the apex; front tibiæ slightly thicker than the middle ones, armed beneath with a series of equidistant black setulæ, front metatarsi also with minute setulæ below; base of middle femora with a rough pencil of black bristles fitting into the excised tip of the middle tibiæ, middle tibiæ in length equalling their femora, provided with close minute setulæ on the under side; hind legs slender, their knees, middle part of tibiæ and base of metatarsi dull yellowish. Halteres dirty white. Wings and veins blackish on outer two-thirds, basal third whitish, anal vein vanishing at its tip, much recurved, the distance between the central cross-veins slightly less than the length of one of them, anterior cross-vein rather oblique, posterior cross-vein perpendicular.

Two males; Cloudcroft, New Mexico, June 19, 1902.

Mr. Viereck took these specimens, together with a series of *Tachydromia rapax*, running up and down the smooth trunks of the quaking aspen (*Populus tremuloides*), somewhat after the manner of the dolichopodid genera *Medeterus* or *Neurigona*.

Tachydromia brachialis sp. nov.

Male. Length 4 mm.—Black species covered with cinereous dust except sides of thorax. Front and occiput cinereous dusted, lower occiput nearly devoid of white hairs. Antennæ yellow, the seta black. Proboscis reddish except the extreme dark tip, palpi white, provided with a single black apical hair. Humeri large, concolorous with the remainder of the dorsum, scutellum with two erect bristles, pleuræ shining black. Abdomen lightly cinereous dusted, the last seg-

ment and the globose hypopygium shining black, upper valves of hypopygium small, bristly, especially the right one, last ventral fringed with moderately long black hairs. Coxæ and legs yellowish, front coxæ with a fringe of hairs beneath, their forward side and the under side of the posterior trochanters with a black spot. Front femora with a black transverse dumb-bell-shaped mark at the middle of the under side, below which is a large elongate curved black space which spreads straight downward to the inferior edge along its lower loop; under side of the front tibiæ and of the hind femora piceous, hind tibiæ fuscous, tarsi infuscated apically; front femora incrassate, ciliate beneath with a double series of conspicuous dusky hairs, front tibiæ slightly incrassate, not setulate but provided with a number of fine short hairs, front metatarsi with minute setulæ; middle and hind femora slender, simple, middle tibiæ slightly surpassing the femora, scarcely indented towards tip. Halteres lightly infuscated. Wings infumated, darker beyond basal third, veins black, all the cross-veins straight, perpendicular, the distance between the central cross-veins equal to the length of the posterior one, anal cross-vein abrupt.

Described from one male taken by Mr. George M. Greene, September 9, 1901, at Boonton, N. J. This may possibly be the insect Mr. Walker described as *similis,* though from his description alone it is impossible to decide. It is a finely characterized species easily distinguished by the fringe on the front femora, which well merits the redescription should it eventually proove to be Mr. Walker's species.

Page 230. **Coloboneura inusitata** mihi.

In the collection at Cambridge are two females from Rhode Island. They differ in no essential way from the description of the males. The humeral callostity is concolorous with the remainder of the thorax. The costa has a basal bristle rather longer than the others.

Page 232. **CHIROMANTIS** Rondani.

Small, slender, sparsely hairy species of light yellow color. Antennæ short, three-jointed, the third joint ovate, with the seta bent downward. Proboscis shorter than the head. Eyes of female separated. Thorax rather prominently raised. Abdomen of male blunt at tip, of the female with a porrect two-styled ovipositor. Legs lengthened, front coxæ as long as the thickened femora. Wings long and narrow, third vein simple, discal cell present, with three veins issuing from it, or wanting, in which case the fourth vein is forked, anal cell shorter than the second basal, anal angle not filled. (Taken from Schiner's description of *Thamnodromia*).

The genus is related to *Litanomyia,* which differs in having the

thorax longer and more cylindrical, and the anal cell not shorter than the second basal.

Chiromantis vocatoria Fallen.

Fallen, Empid., p. 12, No. 15.

Head black. Antennæ yellow, the apex black; the long bristle-like seta white. Front white. Thorax yellow, infuscated above. Abdomen blackish, the venter pale. Legs pale, hind ones simple. Wings hyaline, the first vein short, second vein lengthened, third vein reaching the wing-margin at the extreme tip, fourth and fifth veins equal, forming the long discal cell, from which three veins reach the margin. The hind margin is fringed and rather stout.

This European species is given by Mr. Coquillett in Smith's "List" as from New Jersey.

SCIODROMIA Haliday.

Small, black, almost bare species. Antennæ short, two-jointed, the outer joint ovate, pointed, with a long bristle. Proboscis about as long as the head, fleshy, vertical or projecting forward. Palpi small, appressed to the proboscis. Eyes of both sexes nearly contiguous below the antennæ, widely separated above, the front very broad. Thorax moderately large. Hypopygium of male larger than the diameter of the abdomen, tip of the female abdomen blunt, ciliated. Legs slender, nowhere thickened. Wings long and narrow, all the veins unforked, discal cell moderately large, sending three veins to the wing-margin. Anal cell as long as the second basal, its cross-vein perpendicular. Wings not projecting at the anal angle.

The only important character in which the following species differs from the European type is in the structure of the front, which in Haliday's species is obliterated by the contiguity of the eyes of the male. *Sciodromia* can readily be separated from its near relatives by the following important characters.

Oreothalia has the anal cross-vein parallel with the hind margin.

Synamphotera bicolor has the proboscis incurved.

Ardoptera has the third vein furcate and the head long and narrow.

Sciodromia pullata sp. nov.

Male and Female. Length 2.5–3 mm.—Black species. Vertex, notum and hypopygium covered with olivaceous brown dust, occiput, pleuræ, abdomen and legs with rather more cinereous dust. The narrow face dusted with whitish. Arista slightly longer than the antennæ. Vertex and dorsum of thorax with very few short bristles, scutellum with two bristles. Hypopygium compressed, vertical, twice as deep as the abdomen. Legs slender, black, not spinose or

bristly, ungues and pulvilli minute. Halteres yellow. Wings slender, evenly infumated, no stigmal darkening, veins blackish, second and third veins subparallel toward tip, anal vein evanescent beyond anal cell.

Two males and three females taken in sweepings near the summit of the Las Vegas Range, New Mexico, June 28, 1902 (altitude 11,000 feet), by Mr. H. L. Viereck.

Page 240. Modify table of **CLINOCERA.**

2. Discal cell very oblique apically; two submarginal cells.....3.
   Discal cell moderately broad toward tip.....4.
3. Second submarginal as long as second basal cell.....**simplex** Loew.
   Second submarginal longer.....**lepida** mihi.
4. Stigma obsolete.....5.
   Stigma distinct.....6.
5. Anal vein strong.....**dolicheretma** mihi.
   Anal vein faint.....**conjuncta** Loew.

Page 242. **Clinocera conjuncta** Loew.

Although the description states that the discal cell is small and apically very oblique, the type shows it to be of other conformation. The contact with the second posterior cell is quite broad. Hence *taos* turns out to be closely allied. The first and second posterior cells are of almost equal width at their proximal end. The first section of the front border of the discal cell is slightly over one third the length of the second section. The thorax is olivaceous except a median cinereous stripe between the two black vittæ. The stigmal darkening is scarcely visible.

Page 252. **SYNECHES** Walker.

Modify table thus:

6. Stigma quadrangular.....**quadrangularis** Wh. et Mel.
   Stigma elliptical, diffused.....7.
7. Wings grayish; legs comparatively simple.....**debilis** Coquillett.
   Wings brown, hind femora spinose beneath.....**longipennis** sp. nov.

The white pollinose spots of the thorax of *albonotatus* are best seen when looked at from above.

Syneches longipennis sp. nov.

Male. Length 6 mm.—Rather large, slender species of black body-color. Eyes wine-red, occiput dusted with cinereous. Antennæ, palpi, and proboscis yellow. Thorax and abdomen thinly overlaid with cinereous dust, moderately coated with yellow hairs, thorax relatively little raised, evittate, scutellum with about fifteen hairs; abdomen slender, hypopygium small, terminal, sessile. Coxæ piceous, legs reddish, hairy, hind femora greatly thickened, spinose below and with four spinous bristles on upper-outer edge, last tarsal joint black. Hal-

teres infuscated. Wings brown, narrow, stigma but little darker, veins piceous-brown, marginal cell not widened.

One male; Hertford Co., N. Car., June 9, 1895. (C. W. Johnson).

In stature this species resembles *thoracicus* and *rufus*, but differs conspicuously in the smaller thorax, more elongate abdomen, and different venation. From the smaller species *longipennis* is at once distinct by its bristly femora and darkened wings.

Page 256. **Oedalea ohioensis** mihi.

This is the species given in the New Jersey "List" as *stigmatella* Zett. The following notes made from the New Jersey specimen may be of service. Antennæ two-jointed, the first joint minute, the outer joint large, broad, blunt, equalling the eye-height, the arista minute. Scutellum with four bristles. Legs testaceous. Halteres pale yellow. Stigma very weak, the interstitial vein reaching two-thirds the distance to the margin. Another female differs from the New Jersey specimen in that the wings are nearly clear and the interstitial vein is perfect.

Page 256. **EUTHYNEURA** Macquart.

Discal cell open, fourth vein furcate.....**aperta** sp. nov.
Discal cell normal.....2.
2. Discal cell large, *i. e.*, last section of the fifth vein not more than two-thirds the length of the preceding section.....3.
Discal cell smaller, the two sections of the fifth vein nearly equal.....6.
3. Proboscis at least one-half the height of the head; scutellum with eight or more hairs. Western species.....4.
Proboscis not projecting; scutellum with four hairs. Eastern species **nura** sp. nov.
4. Black species.....5.
Yellow species, with a median vitta brown.....**crocata** Coquillett.
5. Highly polished species.....**flavipilosa** Coquillett.
Opaque species.....**stentor** sp. nov.
6. Proboscis projecting forward, rigid.....**bucinator** sp. nov.
Proboscis minute, fleshy.....7.
7. Outer joint of antennæ circular large; basal cells small...**bulbosa** sp. nov.
Outer joint of antennæ slender, long; second basal cell large. **atripes** sp. nov.

The North American species included in this genus belong more properly with the Empidinæ as they are here defined, but they show a transition toward the Hybotinæ in that the thorax is greatly arched, the anal cross vein is not so strongly inclined as usually is

the case in the Empidinæ, and the proboscis of some of the species at least, projects forward.

Euthyneura bucinator sp. nov.

Female. Length 2.5 mm.—Shining black species with yellow legs. Face and front broad, diverging, shining. Proboscis rigid, black, extending obliquely forward, as long as the height of the head. Thorax bare, highly polished, including the pleuræ; scutellum with six black bristles. Abdomen subshining, brownish towards base. Coxæ and legs yellow, simple, slender, the claws minute. Halteres yellowish. Wings clear hyaline, veins yellow, no stigma, discal cell as long as the second basal, its hind border as long as the outward continuation of that vein, anal vein faint.

One female; Pennsylvania. The antennæ are broken. This is a typical *Euthyneura*: the five other new species conform less perfectly.

Euthyneura aperta sp. nov.

Male. Length 2.5 mm.—Slender black species, with yellowish legs. Head large, eyes cotiguous, the upper facets large. Antennæ inserted low, the second joint broad lanceolate, the style minute. Proboscis rigid, extending straight forward, nearly as long as the head-height. Thorax sparsely pubescent, shining on the pleuræ also; scutellum with six equally long bristles. Abdomen slender, pubescent with whitish to dusky hairs and bristles, sides of first segment with a fringe of white hairs; hypopygium small, simple, narrow, obliquely ascending, black-pubescent. Coxæ and legs yellow, their short sparse hairs black. legs simple, slender, the hind tibiæ slightly thickened, claws and pulvilli small. Halteres pale yellow. Wings hyaline with a faint opalescence, veins white, stigma almost obsolete, whitish, second basal cell broad, discal cell open apically, the fourth vein forked midway its length, anal vein faint, vanishing.

A single male; Cloudcroft, New Mexico. May 27, 1902. (H. L. Viereck).

This species is placed in *Euthyneura* as it departs from typical forms in no more salient characters than do the other species here included. In other genera, e. g., *Thamnodromia*, *Hemerodromia*, or *Rhamphomyia*, the discal cell is often incompletely formed.

Euthyneura stentor sp. nov.

Male. Length 3. mm.—Opaque black, rather slender species. Head rather large, eyes broadly contiguous, facets large above. Antennæ short, inserted low, the second joint elongate conical, suddenly narrowed at the base and then gradually tapering, style short, plainly two-jointed, the first joint thick. Thorax covered with long bristly black hairs; scutellum with ten long hairs. Abdomen cylindrical, deflexed, pubescent with sparse hairs; hypopygium small, consisting of two small deflexed black-bristly valves, and a central forward-extending, trumpet-shaped piece. Legs slender, moderately long, the femora ciliate above and beneath with regular sparse hairs, claws and pulvilli conspicuous. Halteres black. Wings lightly infumated, stigma elliptical blackish, veins narrow, black-

ish, the intercalary vein arises near the fourth posterior vein, discal cell one-third longer than the enlarged second basal, its posterior border one-half longer than the outer continuation of that vein, anal cross vein parallel with the hind border of the wing, forming an even continuation of the vein bounding the second basal cell, anal vein completely obsolete.

One male; Cloudcroft, New Mexico, May 27, 1902. (H. L. Viereck.)

Euthyneura nura sp. nov.

Female. Length 3 mm.—Shining black with reddish legs. Eyes nearly contiguous on the face; front of moderate width. Proboscis and palpi minute, black. Antennæ black, shorter than the head-height, the outer joint compressed, large, two-thirds as deep as long, its style one-third its length. Thorax with spare hairs, notum and pleura strongly polished, scutellum with four dusky hairs. Abdomen slender, polished black, its sparse pubescence dusky. Coxæ and legs yellowish, simple, rather strong, rather densely pubescent, the tips of the hind tibiæ and of the tarsi somewhat dusky, claws and pulvilli small but plain. Halteres yellowish. Wings cinereous hyaline, with broad dusky yellow veins, stigmal spot dusky, filling out the tip of the marginal cell, second vein straight, widely diverging from the third, discal cell one-third longer than the second basal, the vein between the third and fourth posterior cells two-thirds that between the discal and fourth posterior cells, anal vein faint.

One female; Massachusetts.

Euthyneura bulbosa sp. nov.

Male. Length 1.5–2 mm.—Opaque black. Eyes contiguous on the front, upper facets larger. Proboscis short and fleshy, reaching forward. Antennæ short, the second joint large, compressed, circular, the style shorter than the radius of the joint. Thorax very large, provided with short black bristles, scutellum with four long black bristles. Abdomen short, blunt, black-bristly, venter gray pruinose, hypopygium not formed. Legs short and slender, simple, black, tarsi with short bristles, claws small, pulvilli minute. Halteres black. Wings short and broad, cinereous hyaline, veins fuscous, stigma nearly obsolete, discal cell one-third longer than the second basal, the basal cells not enlarged, anal cross vein nearly parallel with the hind margin of the wing, anal vein evanescent, reaching three-fourths to the margin.

Female.—Eyes widely separated. Thorax, abdomen, halteres and legs except tip of tarsi, reddish yellow. Veins reddish. Abdomen pointed.

Numerous specimens collected by Mr. J. Chester Bradley, in net-sweepings, in Chester Co., Pa., during the early part of last June.

Euthyneura atripes sp. nov.

Female. Length 2 mm.—Black species. Head opaque black, face narrow, sides of front parallel, separated as widely as the posterior ocelli. Proboscis short, fleshy, extending forward. Antennæ as long as the height of the head, the outer joint five times as long as deep, slender, not much tapering, its arista equalling its depth. Thorax shining, nearly bare, pleuræ and abdomen lightly dusted with cinereous; scutellum with ten black hairs. Coxæ and legs black,

simple, legs slender, a row of scattered hairs along the under edge of the femora, claws and pulvilli large, empodium minute. Halteres black. Wings large, cinereous hyaline, veins fuscous, a diffused brown stigmal spot present, discal cell as long as the second basal, its hind border about three-fourths as long at the outer continuation of that vein.

A single specimen from Los Angeles Co., California, December 22, 1896. (W. M. Wheeler).

Page 259. **MEGACYTTARUS** Bigot.

Although Mr. Coquillett claims that the mutilated specimen upon which this genus was founded is the same as *Rhamphomyia limbata* Loew, the suppression of the genus seems hardly justifiable on the slight evidence he gives. It is true the diagnosis applies equally well to *Rh. limbata*, but *Megacyttarus* is grouped by M. Bigot with *Ocydromia* which has a projecting proboscis and a truncate anal cell, characters of importance which M. Bigot would hardly overlook. Hence until more definite information is to be had concerning the type the genus and species may be reinstated.

"Allied to Ocydromia. It differs in the short basal cells and the very long, broad, roughly triangular discal cell which is closed by a greatly sinuous transverse vein placed near the hind margin of the wing."

Megacyttarus argenteus Bigot.

Bull. Soc. Ent. France, 1880, xlvii.

Female. Length 5 mm.—Cinereous, the four vittæ of the thorax, the proboscis, the whole of the legs, the extreme tip of the abdomen, and the small stigmal spot of the wings black; abdomen silvery; wings hyaline.

Colorado.

Page 264. **Hilara umbrosa.**

This is the species given in the New Jersey "List" as *Empis brachystoma* Coquillett MSS.

Page 285. Modify table of **EMPIS** as follows:

21. Pile of pleuræ and of abdomen in part pale, or wanting.....22.
    Hairs of bristles of thorax and abdomen wholly black.....31.
22. Species of three mm., size; antennæ reddish at base.....23
    Larger species.....24.
23. Abdomen more or less yellow; veins brown.....**compta** Coquillett.
    Abdomen wholly black; veins white.....**varipes** Loew.
24. Knob of halteres black; abdomen largely shining.....25.
    Knob of halteres yellow; abdomen opaque pollinose.....26.
25. Mesonotal hairs white.....**comantis** Coquillett.
    Mesonotal hairs black.....**brachysoma** Coquillett.

26. Woolly species; scutellum with many bristles....**scatophagina** sp. nov.
Less pubescent species; scutellum with eight or fewer bristles.....27
27. Scutellum with six to eight bristles..... **obesa** Loew.
Bristles of scutellum four or less.....28.
28. Pile of body luteous.....**Aldrichii** mihi.
Pile of body white or wanting.....29.
29. Species devoid of hairs; wings clear hyaline, sixth vein evaneacent.
neomexicana sp. nov.
More or less pubescent species; sixth vein normal.....29*a*.
29*a*. Scutellum with two bristles; dorsum of abdomen brown pollinose; legs of female ciliate with black scales.....**captus** Coquillett.
Scutellum with four bristles.....30.
30. Stigma brown, wings gray, abdomen blue-gray pollinose.
a vida Coquillett.
Stigma wanting, abdomen more or less brownish above.....30*a*.
30*a*. Antennæ and proboscis yellow at base.....**levicula** Coquillett.
Antennæ and proboscis black.....**vaginifer** sp. nov.

Empis scatophagina sp. nov.

Male. Length 9 mm.—Stout black species, densely clothed with mixed yellow and dusky woolly pubescence, the darker hairs prevailing on the mesonotum. Eyes contiguous; facets uniform. Face covered with brown-gray pollen. Antennæ short, black, third joint lanceolate, one-third as wide as long, its style two-thirds its length. Palpi porrect, ribbon-like, luteous, with a few long black forward-extending hairs beneath. Proboscis slender, black, reaching to the tip of the middle coxæ. Occiput densely covered with dusky pubescence above and with yellowish below. Thorax with four narrow glabrous vittæ, the outer pair abbreviated behind, densely covered with pubescence, the darker hairs slightly longer and directed posteriorly, the lighter hairs shorter and straighter, especially on the humeri where the dense yellow hairs extend forward. Above the base of the wings and at the posterior end of the middle vittæ are bunches of black bristles; scutellum bearing about twenty bristles; metapleuræ with a dense mat of yellow hairs; pleuræ cinereous dusted. Abdomen cylindrical, stout, somewhat shining, with long dense yellow pubescence; no ventral projections; hypopygium comparatively small, outwardly fulvous, closed, globose, its lower valve with a fringe of yellow hairs, central filament hidden, except at base, middle lamellæ scarcely larger than upper ones. Coxæ black, dusted with gray and provided with yellow pubescence; middle and hind ones with a row of longer black hairs along outer side; trochanters black, shining. Legs dark castaneous, shining, not thickened, unarmed, provided with short black bristles; tarsi piceous, black apically. Halteres yellow. Wings lightly and evenly infumated, stigma faint, elongate and very narrow, veins narrow, dark brown, normal, anterior branch of the third vein oblique and curved, discal cell two-thirds as long as the ultimate section of the fourth vein.

Female.—Differs thus: eyes widely separated; pubescence shorter; front and hind edges of middle and hind femora ciliate with short black scale-like hairs; inner edge of hind tibiæ likewise fringed, but not so densely.

One male and one female. Sitka, Alaska, in the Loew collection in the Museum of Comparative Zoology, Harvard University.

This species is closely related to *obesa* Loew, but differs in the much denser vestiture of the body.

Empis neomexicana sp. nov.

Male and Female. Length of body 6 mm., of wing 9 mm.—Black species, finely dusted with brownish pollen, devoid of all pile and bristles, the extremely short and sparse pubescence of the body and legs whitish. Occiput gray dusted. Antennæ black, moderately long, the third joint lanceolate, its style short and thick. Palpi short, pale yellow; proboscis black, nearly three times the height of the head. Thorax with four brown vittæ, obliterated in front of the scutellum; scutellum and metapleuræ with no bristles. Abdomen cylindrical, the basal segments dusky yellowish in the male, hypopygium not large, erect, pedunculate by the flattened projecting basal piece, upper lamellæ fleshy, yellow, middle lamellæ black, triangular, their free ends touching and encircling a deflexed curved spur-like process, from the base of the forward side of the hypopygium arise a pair of long erect filiform reddish styles. Coxæ and legs yellow, hind legs from middle of femora outward dusky, legs simple and slender in both sexes. Halteres yellow. Wings hyaline, veins dark brown, thin, stigma faint, elongate, situated far from the tip of the marginal cell, which extends considerably beyond the furcation of the third vein, second section of the front border of the discal cell five times the length of the first section, its hind border equal to the outward continuation of that vein, anal vein wanting in the male, evanescent in the female.

One male and one female from the top of the Las Vegas Range, New Mexico, June 28, 1902, altitude 11,000 feet. (H. L. Viereck).

Empis vaginifer sp. nov.

Male. Length 5 mm.—Black, thickly overlaid with fine silvery-gray dust. Eyes broadly contiguous above the antennæ, facets uniform and small. Face with brownish dust. Antennæ short, black, not bristly, the third joint twice as long as broad, its arista equal to its breadth. Palpi slender, short, yellow; proboscis nearly twice the height of the head, black. Occiput gray dusted, with two irregular rows of sparse short black bristles above, and below with a small bunch of fine white hairs on each side in back of the cheeks. Thorax dusted with gray, almost devoid of hairs, the acrostichals and dorsi-centrals short and sparse, humeral and lateral bristles stronger; notum provided with four rather broad slaty-brown vittæ; scutellum with four short bristles; pectus with a few white hairs; metapleuræ with a fine bunch of white hairs. Abdomen depressed, cinereous-dusted, the basal segments provided with sparse white hairs laterally; the seventh dorsal segment strongly convex, almost hemispherical, the eighth minute, together with the small hypopygium hidden within the large tubular testaceous eighth ventral segment, which is produced at its upper basal angles into two stout cylindrical processes articulating with suitable callosities on the sixth dorsal. Coxæ rufous, but overlaid with cinereous dust, provided outwardly with a few short bristles, those of the base of the front ones whitish, the others black. Legs rather shining, testaceous, their bristles small, the outer ends of the tarsal joints somewhat more dusky; tarsal joints evenly decreasing in length, the front and middle tarsi cylindrical, the hind metatarsi and hind tibiæ as thick

as the femora, the inflation of the tarsus gradually subsiding apically; pulvilli reddish. Halteres large, yellow. Wings clear hyaline, stigma wanting, the veins pale brown, normal, third vein furcate beyond the marginal cell, the hind border of the discal cell two-thirds the length of the outward continuation of that vein.

One male, District of Columbia. In the Osten Sacken Collection at the Museum of Comparative Zoology, Cambridge, Mass.

Page 298. **Empis longipes** Loew.

In the male the tips of the front coxæ, the forward side of the middle ones and the outer half of the hind ones, together with the underside of the hind trochanters are provided with conspicuous black bristles. The hind trochanters are bordered apically with black. In the female, the hairs are shorter and the black of the trochanters is reduced to a spot. The male hypopygium is densely covered with fine dusky hairs on the outer portion of the middle lamellæ, while the lower valve is fringed with fine black bristles.

Page 301. **Empis armipes** Loew.

The armament of the hind legs of the male is much like that of *mixopolia*.

Page 304. **Empis stenoptera** Loew.

Dr. Loew makes no mention of an important secondary sexual character of this species. The underside of the hind trochanters of the male is provided with a fringe of black spiny scales, which places the species in a group with *nuda* and *cacuminifer*.

Page 309. **Empis obesa** Loew.

This species measures eight mm. instead of three as given in the Centuries. Having been led astray by this fact, Mr. Coquillett established his *ravida* upon the same form.

Page 322.

The dubious *poplitea* is the same as *serperastrorum*, the description of which will have to go under the name of Loew's species.

Page 330. **Empimorpha comantis** Coquillett.

A male and a female, also from San Francisco, collected by Mr. H. Edwards, are in the Loew collection at Cambridge. The male is

typical, but the female departs from Mr. Coquillett's type. In this specimen the hirsuteness of the body is much reduced, on the face almost completely disappearing, and elsewhere shorter and sparser than in the male. The chætotaxy of the coxæ is similar for both sexes. Both also have a series of short black bristles on the underside of the middle and hind femora. The structure of the hypopygium, as well as the whole habitus, suggests the group *obesa* of *Empis*, which, in consideration of the nearly glabrous face, renders the validity of Mr. Coquillett's genus somewhat precarious.

Page 332. **Iteaphila orchestris** sp. nov.

Male and Female. Length 5 mm.—Deep opaque black over all, the thorax of the female with dark brown dust, rather hairy species. Eyes of the male contiguous on the front, of the female very widely separated. Antennæ equalling the height of the head, first two joints moderately large, barrel-shaped, with but few hairs, third joint twice as long as basal two, elongate-lanceolate, not much tapering, blunt, its short arista two-jointed, the first joint thick, the second minute. Proboscis about as long as the head-head, extending straight forward, stouter than in *peregrina*, palpi slender, equalling the proboscis in length, and applied to it, provided with numerous black hairs. Face bare, occiput covered with dense black pubescence. Thorax moderately pubescent, the hairs sparser and longer posteriorly, the pubescence wanting on two vittæ of piceous color, scutellum with a fringe of about twenty long hairs; abdomen moderately pubescent basally. The vestiture of the female is much reduced, and not of such a deep black color. Genitalia of the male small, consisting of several projecting filamentous appendages. Legs slender, the knees sometimes brownish, the femora of the male with regular sparse black cilia above and below. Halteres black, the pedicels yellowish in the female. Wings of the male rather pointed, very lightly infumated, stigma elongate, narrow, smoky, veins black, third vein furcate quite a distance beyond the tip of the marginal cell, the submarginal cell therefore small; of the female, the wings are hyaline, the veins dark fuscous, becoming yellow at the base, the apex is blunter, while the third vein is furcate just beyond the end of the marginal cell, stigma faint.

Described from numerous specimens taken by Mr. H. L. Viereck, June 28, 1902, near the top of the Las Vegas Range, New Mexico, at an altitude of 11,000 feet. The species differs apparently from *macquarti* in that the veins are not at all bordered with brown, and the third antennal joint is not oval. From *peregrina* it can be readily distinguished by the hirsute body and shortened proboscis.

These flies were swarming over a small creek-bed in an anæmotropic dance so characteristic of many of the members of this subfamily.

CATALOGUE OF THE NORTH AMERICAN SPECIES OF EMPIDIDÆ.

MYTHICOMYIINÆ.

Mythicomyia Coquillett.

Rileyi *Coq.* Calif.
tibialis *Coq.* Calif.

Hilaromorpha Schiner.

Mikii *Willist.* Ill.
obscura *Big.* Calif.

TACHYDROMIINÆ.

Phoneutisca Loew.

bimaculata *Lw.* Alaska, S. Dak. Fig. 1.
simplicior *Wh. et Mel.* Mex. Fig. 6.

Stilpon Loew.

varipes *Lw.* Penn.
Houghii sp. nov. Mass. Figs. 2, 3.
pectiniger sp. nov. Mass., Wisc. Figs. 4, 5.
minuta sp. nov. N. Mex.
nigripes sp. nov. N. Mex.

Drapetis Meigen.

unipila *Lw.* Tex., Cal. Figs. 10, 14, 21.
medetera sp. nov. Colo., Ariz., Wyom. Fig. 22.
nigra *Meig.* S. Dak. Figs. 12, 17, 24.
dividua sp. nov. Id. Figs. 16, 18, 23.
latipennis sp. nov. Wis., Ks. Figs. 11, 19.
apicis *Willist.* St. Vincent.
pubescens *Lw.* N. Y.
divergens *Lw.* Ga., Ala., Tex. Fig. 15.
minuta *Willist.* St. Vincent.
femoralis *Wh. et Mel.* Mex. Fig. 13.
septentrionalis sp. nov. Mich.
spectabilis sp. nov. Mass., Tex. Figs. 9, 20.
gilvipes *Lw.* Tex., St. Vincent, Ga.
flavida *Willist.* Yucatan, Mex., W. Ind., La.

Elaphropeza Macquart.

montana sp. nov. Colo. Figs. 7, 8.

Platypalpus Macquart.

trivialis *Lw.* Me., Mass., D. C. Figs. 26, 34, 43.
caligatus sp. nov. Mex. Figs. 27, 35, 46.
lupatus sp. nov. N. M.
pachycnemus *Lw.* D. C., N. J.
monticola sp. nov. Col. Fig. 41.
pluto sp. nov. Id., Cal. Fig. 39.
apicalis *Lw.* Penn., N. Y., Mass.
diversipes *Coq.* Alaska.
incultus *Coq.* Cal., Tex.
tersus *Coq.* N. Car., Ga., La.
impexus sp. nov. Mich., S. Dak.
lætus *Lw.* N. H.
flavirostris *Lw.* N. H.
mesogrammus *Lw.* N. J., D. C., Penn., Tenn.
vicarius *Walk.*
canus sp. nov. Cal. Figs. 29, 40, 45.
hians sp. nov. Col. Figs. 32, 36, 37.
inops sp. nov. Wyom., Id.
incurvus sp. nov. Cal. Figs. 31, 33, 34.
gravidus sp. nov. Cal. Figs. 25, 42.
lateralis *Lw.* N. H.
discifer *Lw.* D. C.
hastatus sp. nov. Ks., Id., N. Mex. Fig. 30.
æqualis *Lw.* Mass., Quebec, Id., La., Cal.
crassifemoris *Fitch.* Mass., Mich., Id., Penn.
tenellus sp. nov. Ill., S. D. Figs. 28, 38.
gilvipes *Coq.* Alaska.
rufiventris sp. nov. N. Mex.
Vierecki sp. nov. N. Mex.

Tachydromia Macquart.

Schwarzii *Coq.* Tex., Mex., Id. Wyom., Cal. Fig. 52.
enecator sp. nov. Quebec, Wyom.
bacis *Walk.* Jamaica.
vittipennis *Walk.*
inusta sp. nov. N. Mex., Id. Figs. 50, 54.
portæcola *Walk.* H. Bay.
Winthemi *Zett.* N. H.
postica *Walk.* Ks. Fig. 53.

fenestrata *Say*. Mid. States.
similis *Walk*. H. Bay.
maculipennis *Walk*. H. Bay.
clavipes *Lw*. Ill.
pusilla *Lw*. Mass., N. J., Ill. Fig. 51.
rostrata *Lw*. N. H., Mass.
rapax *Lw*. Mass., Ind., Wis., Wyom., N. Mex. Fig. 55.
nubifera *Coq*. Bering Is.
corticalis sp. nov. N. Mex.
brachialis sp. nov. N. J.

Coloboneura gen. nov.

inusitata sp. nov. Fla., Mass., R. I. Figs. 47–49.

HEMERODROMIINÆ.

Hemerodromia Meigen.

scapularis *Lw*. Me., Penn., Md., Tenn., Wyom., N. Mex. Fig. 59.
mexicana sp. nov. Mex. Figs. 56, 60.
collusor sp. nov. Col., Wyom. Figs. 57, 58, 64.
defecta *Lw*. D. C., N. J.
superstitiosa *Say*. N. W. Terr., Fla.
rogatoris *Coq*. N. C., La., Queb., Wis., Wyom. Fig. 65.
empiformis *Say*. Pa., Fla., N. J., Ill., St. Vincent? N. Y.?
defessa *Willist*. St. Vincent.
captus *Coq*. N. Y.
albipes *Walk*. H. Bay Terr.
notata *Lw*. Ill.
valida *Lw*. H. B. Terr.
præcatoria *Fall*. H. Bay Terr.
obsoleta *Lw*. Ill.
palloris *Coq*. N. H.

Litanomyia gen. nov.

mexicana *Wh. et Mel*. Mex.
elongata sp. nov. Mass., Can. Wis., S. D.

Chiromantis Rondani.

vocatoria *Fall*. N. J.

Synamphotera Loew.

bicolor *Lw*. Alaska.

Oreothalia gen. nov.

pelops sp. nov. Id.

Sciodromia Haliday.

pullata sp. nov. N. Mex

Rœderiodes Coquillett.

juncta *Coq*. N. Y.

Ardoptera Macquart.

irrorata *Fall*. Europe, N. Am.

Clinocera Meigen.

simplex *Lw*. H. Bay Terr.
lepida sp. nov. Id.
dolicheretma sp. nov. Id.
conjuncta *Lw*. D. C.
taos sp. nov. N. H.
lecta sp. nov. Id.
binotata *Lw*. N. Y., Quebec.
maculata *Lw*. D. C.
lineata *Lw*. Penn., Wash. Figs. 61, 62.
fuscipennis *Lw*. N. H.
maculipes *Big*. Cal.

HYBOTINÆ.

Meghyperus Loew.

occidens *Coq*. Cal.
nitidus sp. nov. Id. Figs. 72, 73.

Syneches Walker.

albonotatus *Lw*. D. C.
hyalinus *Coq*. Md.
pusillus *Lw*. W. Ind., N. Y., Wis., Ks., Fla.
debilis *Coq*. Ga., D. C., Md.
quadrangularis *Wh. et Mel*. Mexico. Fig. 85.
rufus *Lw*. N. Y., Ohio, Ill., Wis.
thoracicus *Say*. Pa., N. C., Ky., Ill. Fig. 84.
simplex *Walk*. Mass., N. C., Ga., Fla., Wisc., Ont. Fig. 86.
longipennis sp. nov. N. C.

Syndyas Loew.

dorsalis *Lw.* N. Y., Ill.
polita *Lw.* Mass., La., Ks. Fig. 83.

Hybos Meigen.

typicus *Wh. et Mel.* Mex.
spinicosta *Wh. et Mel.* Mex. Fig. 77.
mellipes *Wh. et Mel.* Mex. Fig. 78.
electus nom. nov. W. Ind., Mass., La., Fla.
Slossonæ *Coq.* Mass., N. H., Wis.
reversus *Walk.* N. J.
triplex *Walk.* Yucatan, Mex., Mass., Fla., Col. Fig. 79-81.
sequens nom. nov. Mex.

Oedalea Meigen.

ohioensis sp. nov. Ohio, N. J. Figs. 74-76.

Leptopeza Macquart.

flavipes *Meig.* Va. (Europe). Fig. 68.
disparilis sp. nov. Cal., Id. Fig. 69.
compta *Coq.* Mass., Ohio, Wis., Ill., Tenn. Fig. 70.

Ocydromia Meigen.

glabricula *Fall.* Wis., Wyom., N. Mex., Vanc. Figs. 66, 67.

Megacyttarus Bigot.

argenteus *Big.* Col.

Brachystoma Meigen.

Robertsonii *Coq.* Ohio, Tenn., Ill.
occidentalis sp. nov. Id., Wash. Fig. 80.

Blepharoprocta Loew.

nigrimana *Lw.* Ill.
binummus *Lw.* D. C., Ohio. Figs. 91, 92.
serratula *Lw.* Ga., Tenn. Fig. 90.

EMPIDINÆ.

Empimorpha Coquillett.

barbata *Lw.* Cal. Fig. 106.
comantis *Coq.* Cal.
geneatis sp. nov. Cal. Fig. 105.

Pachymeria Stephens.

pudica *Lw.* D. C., Va., Penn., N. J., Cloudcroft, N. Mex.
brevis *Lw.* D. C.

Empis Linneaus.

annulipes *Wh. et Mel.* Mex. Fig. 115.
montezuma *Wh. et Mel.* Mex. Fig. 114.
bicolor *Bell.* Mex. Figs. 112, 113.
atrifemur *Wh. et Mel.* Mex. Figs. 116, 117.
azteca *Wh. et Mel.* Mex. Fig. 119.
pegasus *O. S.* Mex.
xochitl *Wh. et Mel.* Mex. Fig. 118.
totipennis *Bell.* Mex.
spiloptera *Wied.* Mex.
clausa *Coq.* Tex., S. D., Ill., Ohio. Fig. 129.
asema sp. nov. Tex. Fig. 130.
triangula *Coq.* Alaska.
labiata *Lw.* D. C.
distans *Lw.* Conn., Penn., La., Ga. Fig. 127.
dolorosa *Wh. et Mel.* Mex. Fig. 128.
cornus *Walk.* H. Bay Terr., Col. ?
luctuosa *Kirby.* Brit. Am.
gulosa *Coq.* Ill.
humile *Coq.* Ill.
poeciloptera *Lw.* N. Y.
longipes *Lw.* N. Y., Penn
sordida *Lw.* D. C.
abcirus *Walk.* Ga.
eudamidas *Walk.*
amytis *Walk.* N. Y.
ollius *Walk.* N. Scot.
laniventris *Esch.* Unalaska, Bering Is., Copper Is.
colonica *Walk.* N. Scot.
leptogastra *Lw.* D. C.
armipes *Lw.* N. Y.
tridentata *Coq.* Penn. Fig. 132.
pallida *Lw.* N. Y.
rufescens *Lw.* N. H., Mass. Fig. 120.
rubida *Wh. et Mel.* Mex. Fig. 121.
otiosa *Coq.* Ill., Conn., Ks., La., Mass. Fig. 122.
Johnsoni sp. nov. Penn. Fig. 123.

enodis sp. nov. Ill. Fig. 125.
cacuminifer sp. nov. Ohio, Ala. Fig. 124.
stenoptera *Lw.* N. H.
nuda *Lw.* Ill., Montreal. Fig. 126.
compta *Coq.* Ill., La.
varipes *Lw.* Pa.
levicula *Coq.* Ill.
neomexicana sp. nov. N. Mex.
vaginifer sp. nov. D. C.
scatophagina sp. nov. Alaska.
avida *Coq.* Ill.
comantis *Coq.* Cal.
brachysoma *Coq.* Alaska. Fig. 110.
Aldrichii sp. nov. Id., Oreg. Fig. 110.
obesa *Lw.* N. H., Mass., Ga., Id., Wash. Fig. 111.
captus *Coq.* N. Car., Ga.
tersa *Coq.* N. Car.
tenebrosa *Coq.* Tex.
spectabilis *Lw.* Md., N. J. Pa. Fig. 109.
lævigata *Lw.* N. H.
virgata *Coq.* Wash., Br. Col. Fig. 108.
pellucida *Coq.* Alaska.
fumida *Coq.* Alaska.
infumata *Coq.* Alaska.
cæligena sp. nov. Ala. Fig. 107.
teres sp. nov. Id. Figs. 133, 142.
loripedis *Coq.* Ill., Ohio, Penn. Fig. 131.
gladiator sp. nov. Ks. Fig. 134.
arthritica sp. nov. Pa. Figs. 135, 144.
podagra sp. nov. Id.
mira *Big.* Cal.
Bigoti nom. nov. Cal.
manca *Coq.* Cal.
valentis *Coq.* Cal. Fig. 138.
clauda *Coq.* Alaska.
poplitea *Lw.* Alaska, Vanc., Id., Col., N. Mex. Figs. 136, 145.
aerobatica sp. nov. Cal., Id.
nodipes sp. nov. N. Mex. Fig. 143.
dolabraria sp. sp. Cal.
falcata sp. nov. Id., Cal., N. Mex. Fig. 137.
canaster sp. nov. Id., Oreg. Figs. 139, 140.
æripes sp. nov. Id. Fig. 141.
mixopolia sp. nov. Id.

Hilara Meigen.

viridis *Coq.* Jamaica.
testacea *Lw.* N. H., N. J.
lutea *Lw.* D. C., N. J.
femorata *Lw.* N. J., N. Y., Md., Ohio, Wis.
aurata *Coq.* Me., Alaska.
umbrosa *Lw.* Mass., Ill.
basalis *Lw.* Ill.
quadrivittata *Meig.* Alaska.
leucoptera *Lw.* Fla., N. J.
bella sp. nov. Mass. Fig. 94.
macroptera *Lw.* D. C.
congregaria sp. nov. Cal.
Johnsoni *Coq.* Ala.
tristis *Lw.* N. H., N. J.
mutabilis *Lw.* Ill., N. J.
trivittata *Lw.* Ill., Ala., Tex.
nugax sp. nov. Cal.
cana *Coq.* Cal.
baculifer sp. nov. Ga. Fig. 96.
unicolor *Lw,* Mass., Md.
velutina *Lw.* D. C.
atra *Lw.* Mass., Ill., Col., N. Mex.
carbonaria sp. nov. Mass.
brevipila *Lw.* Ill.
gracilis *Lw.* Pa., N. J.
nigriventris *Lw.* Pa.
seriata *Lw.* N. H., N. J.
Wheeleri *Mel.* Wyom. Fig. 95.

Gloma Meigen.

rufa *Lw.* N. H.
obscura *Lw.* N. H., Id. Fig. 93.
scopifera *Coq.* Alaska.

Ragas Walker.

mabelæ sp. nov. Id. Fig. 98.
conjuncta *Coq.* Alaska.

Hormopeza Zetterstedt.

bullata sp. nov. Wyom. Fig. 88.
brevicornis *Lw.* S. Dak., Id., Wyom., Alaska. Fig. 87.
nigricans *Lw.* Id., Alaska.

Lamprempis Wheeler et Melalder, gen. nov.

violacea *Lw.* Mex. Figs. 103, 104.

superba *Lw.* Cuba.
cyanea *Bell.* Mex.
suavis *Lw.* Mex.
chichimeca *Wh. et Mel.* Mex. Figs. 100, 101, 102.
diaphorina *O. S.* Mex.
benigna *O. S.*

Heaphila Zetterstedt.

peregrina sp. nov. Cal. Fig. 97.
Macquart *Zett.* N. H., Quebec.
orchestris sp. nov. N. Mex

Microphorus Macquart.

drapetoides *Walk.* H. Bay Terr.

Holoclera Schiner.

ravida *Coq.* Cal.
atrata *Coq.* Alaska.
sycophantor sp. nov. Id.
bilineata sp. nov. La. Fig. 99.

Euthyneura Macquart.

flavipilosa *Coq.* Br. Col.
crocata *Coq.* Alaska.
bucinator sp. nov. Penn.
nura sp. nov. Mass.
atripes sp. nov. Cal.
bulbosa sp. nov. Penn.
stentor sp. nov. N. Mex.
aperta sp. nov. N. Mex.

Cyrtoma Meigen.

halteralis *Lw.* D. C., Wis.
femorata *Lw.* N. H.
procera *Lw.* Alaska.
longipes *Lw.* Mass., Wyom., N. H., Ill., N. Mex. Fig. 71.
pilipes *Lw.* Ill.

EXPLANATION OF THE PLATES.

PLATE V.

Fig. 1. *Phoneutisca bimaculata* Lw., wing.
" 2. *Stilpon Houghii* sp. nov., antenna.
" 3. " " hypopygium.
" 4. " *pectiniger* sp. nov., wing.
" 5. *Elaphropeza montana* sp. nov., wing.
" 6. *Phoneutisca simplicior* Wh. et. Mel., wing.
" 7. *Elaphropeza montana* sp. nov., wing.
" 8. " " antenna.
" 9. *Drapetis spectabilis* sp. nov., wing.
" 10. " *unipila* Lw., wing.
" 11. " *latipennis* sp. nov., wing.
" 12. " *nigra* Meig., wing.
" 13. " *femoralis* Wh. et Mel., wing.
" 14. " *unipila* Lw., right hind leg.
" 15. " *divergens* Lw., wing.
" 16. " *dividua* sp. nov., wing.
" 17. " *nigra* Meig., antenna.
" 18. " *dividua* sp. nov., apical joint of antenna.
" 19. " *latipennis* sp. nov., antenna.
" 20. " *spectabilis* sp. nov., right antenna from above and inside.
" 21. " *unipila* Lw., outer side of the right antenna.
" 22. " *medetera* sp. nov., right antenna.
" 23. " *dividua* sp. nov., hypopygium.

Fig. 24. *Drapetis nigra* Meig., hypopygium.
" 25. *Platypalpus gravidus* sp. nov., antenna.
" 26. " *trivialis* Lw., antenna.
" 27. " *caligatus* sp. nov., antenna.
" 28. " *tenellus* sp. nov., antenna.
" 29. " *canus* sp. nov., antenna.
" 30. " *hastatus* sp. nov., antenna.
" 31. " *incurvus* sp. nov., antenna.
" 32. " *hians* sp. nov., antenna.
" 33. " *incurvus* sp. nov., wing.
" 34. " *trivialis* Lw., wing of male.

PLATE VI.

Fig. 35. *Platypalpus caligatus* sp. nov., wing of male.
" 36. " *hians* sp. nov., head.
" 37. " " wing of male.
" 38. " *tenellus* sp. nov., hypopygium.
" 39. " *pluto* sp. nov., wing.
" 40. " *canus* sp. nov., wing.
" 41. " *monticola* sp. nov., hypopygium.
" 42. " *gravidus* sp. nov., wing.
" 43. " *trivialis* Lw., hypopygium.
" 44. " *incurvus* sp. nov., hypopygium.
" 45. " *canus* sp. nov., hypopygium.
" 46. " *caligatus* sp. nov., hypopygium from above.
" 47. *Coloboneura innsitata* sp. nov., head.
" 48. " " wing.
" 49. " " antenna.
" 50. *Tachydromia inusta* sp. nov., wing.
" 51. " *pusilla* Lw., hypopygium.
" 52. " *Schwarzii* Coq., wing.
" 53. " *postica* Walk., hypopygium.
" 54. " *inusta* sp. nov., hypopygium.
" 55. " *rapax* Lw., hypopygium.
" 56. *Hemerodromia mexicana* sp. nov., wing.
" 57. " *collusor* sp. nov., antenna.
" 58. " " hypopygium.
" 59. " *scapularis* Lw., hypopygium.
" 60. " *mexicana* sp. nov., hypopygium.

PLATE VII.

Fig. 61. *Clinocera lineata* Lw., wing.
" 62. " " antenna.
" 63. *Litanomyia mexicana* Wh. et Mel., wing.
" 64. *Hemerodromia collusor* sp. nov., hypopygium.
" 65. " *rogatoris* Coq., hypopygium.
" 66. *Ocydromia glabricula* Fall., antenna.
" 67. " " hypopygium.

Fig. 68. *Leptopeza flavipes* Meig., antenna.
" 69. " *disparilis* sp. nov., hypopygium.
" 70. " *compta* Coq., hypopygium.
" 71. *Cyrtoma longipes* Lw., wing.
" 72. *Meghyperus nitidus* sp. nov., antenna.
" 73. " " wing.
" 74. *Oedalea ohioensis* sp. nov., leg.
" 75. " " wing.
" 76. " " hypopygium.
" 77. *Hybos spinicosta* Wh. et Mel., wing.
" 78. " *mellipes* Wh. et Mel., wing.
" 79. " *triplex* Walk., hypopygium.
" 80. " " antenna.
" 81. " " antenna.
" 82. *Lactistomyia insolita* gen. et sp. nov., leg.
" 83. *Syndyas polita* Lw., wing.
" 84. *Syneches thoracicus* Say, wing.
" 85. " *quadrangularis* Wh. et Mel., wing.
" 86. " *simplex* Walk., wing.

PLATE VIII.

Fig. 87. *Hormopeza brevicornis* Lw., hypopygium.
" 88. " *bullata* sp. nov., antenna.
" 89. *Brachystoma occidentalis* sp. nov., whole insect.
" 90. *Blepharoprocta serratula* Lw., wing.
" 91. " *binummus* Lw., hypopygium.
" 92. " " side view of the hypopygium.
" 93. *Gloma obscura* Lw., wing.
" 94. *Hilara bella* sp. nov., leg of male.
" 95. " *wheeleri* Mel., front leg of male.
" 96. " *baculifer* sp. nov., fore leg of male.
" 97. *Iteaphila peregrina* sp. nov., hypopygium.
" 98. *Ragas mabelæ* sp. nov., hypopygium.
" 99. *Holoclera bilineata* sp. nov., wing.
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" 101. " " hypopygium.
" 102. " " hind leg of male.
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" 104. " " hypopygium from the side.
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" 106. " *barbata* Lw., hypopygium.
" 107. *Empis cæligena* sp. nov., male abdomen.
" 108. " *virgata* Coq., male abdomen.

PLATE IX.

Fig. 109. *Empis spectabilis* Lw., hypopygium.
" 110. " *Aldrichii* sp. nov., hypopygium.
" 111. " *obesa* Lw., hypopygium.
" 112. " *bicolor* Bell., wing of male.

Fig. 113. *Empis bicolor* Bell, middle tarsus of male.
" 114. " *montezuma* Wh. et Mel., hypopygium.
" 115. " *annulipes* Wh. et Mel., front tarsus.
" 116. " *atrifemur* Wh. et Mel., front tarsus.
" 117. " " antenna.
" 118. " *xochitl* Wh. et Mel., hind metatarsus.
" 119. " *azteca* Wh. et Mel., wing.
" 120. " *rufescens* Lw., hypopygium.
" 121. " *rubida* Wh. et Mel., wing.
" 122. " *otiosa* Coq., hypopygium.
" 123. " *Johnsoni* sp. nov., hypopygium.
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" 125. " *enodis* sp. nov., hypopygium.
" 126. " *nuda* Lw., hypopygium.
" 127. " *distans* Lw., wing.
" 128. " *dolorosa* Wh. et Mel., wing.
" 129. " *clausa* Coq., wing.
" 130. " *asema* sp. nov., hypopygium.
" 131. " *loripedis* Coq., hypopygium.
" 132. " *tridentata* Coq., hypopygium.
" 133. " *teres* sp. nov., hypopygium.
" 134. " *gladiator* sp. nov., hypopygium.
" 135. " *arthritica* sp. nov., hypopygium.
" 136. " *poplitea* Lw., hypopygium.
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" 138. " *valentis* Coq., hypopygium.
" 139. " *cannaster* sp. nov., hypopygium.
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" 141. " *xeripes* sp. nov., hind leg of male.
" 142. " *teres* sp. nov., hind leg of male from inside.
" 143. " *nodipes* sp. nov., hind leg of male from outside.
" 144. " *arthritica* sp. nov., hind leg of male from outside.
" 145. " *poplitea* Lw., hind leg of male from inside.

NOTE.—This paper was accepted by the faculty of Arts, Science and Literature of the University of Texas as a thesis for the degree of Master of Science.

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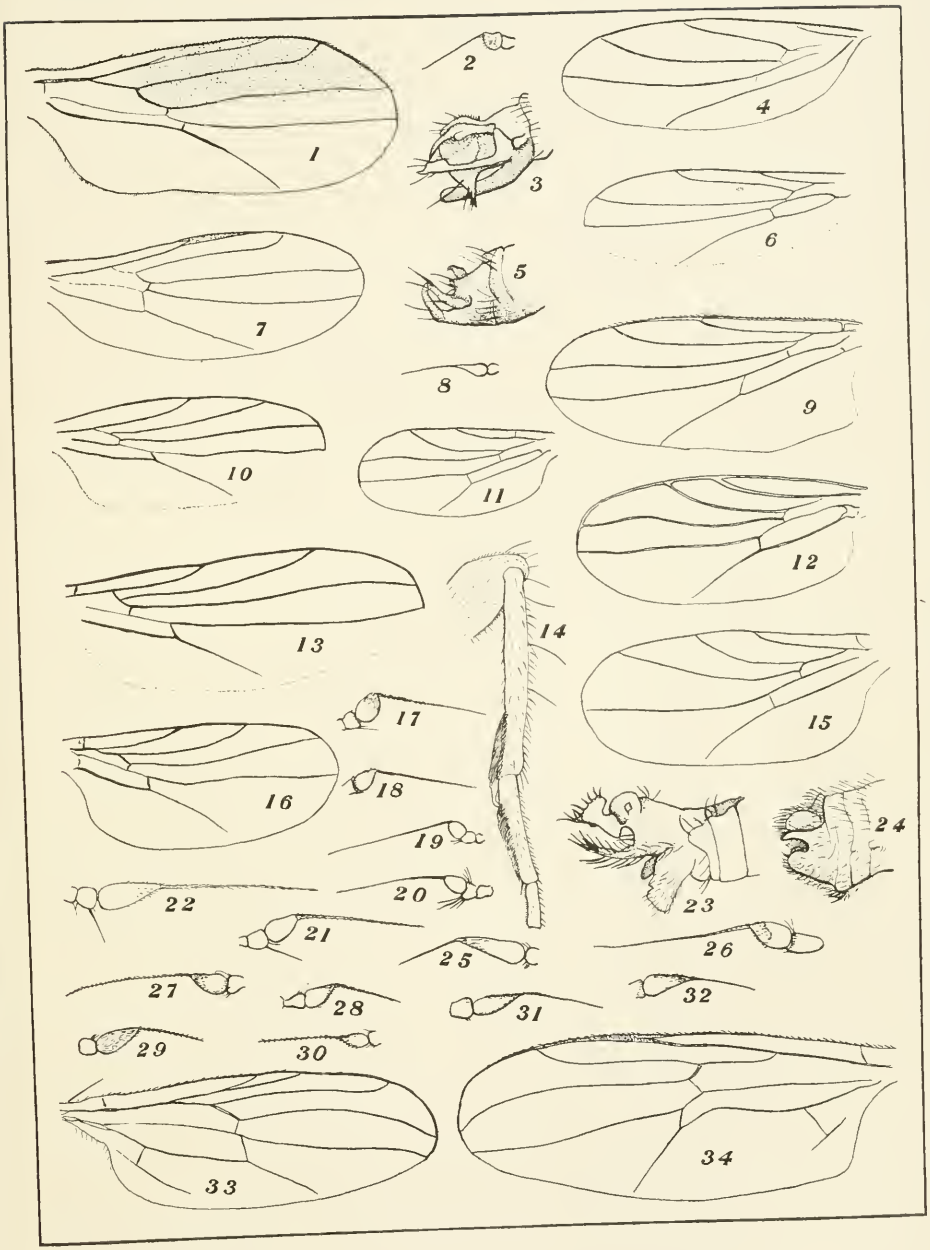
ERRATA.

Page 195, line 2, *for* Dipteron, *read* dipterous.
" 198, " 5, " anal canal, *read* anal cell.
" 200, " 15, " ærial, *read* aerial.
" 201, " 12, " *ærobatica*, read *aerobatica*.
" 205, *Stilpon pectiniger*, line 5, fourth word, *read* asymmetrical.
" 209, line 2, for *niger* read *nigra*.
" 213, *Drapetis gilvipes*, reference should read Cent. x, 61.
" 232, *Litanomyia elongata*, line 9, second word, *read* parallel.
" 233, line 6, fifth word, *read* acrostichals.
" 233, *Oreothalia pelops*, size should read 3 mm.
" 245, *Clinocera maculipes*, reference should include p. 118.
" 246, last line of table, for *triples* read *triplex*.
" 247, *Hybos mellipes*, reference should include p. 373.
" 247, " " line 6, third word, *read* cinerascent.
" 250, line 7, for *Scelobates*, read *Scelolabes*.
" 256, *Oedalea ohioensis*, line 6, for prealer, *read* prealar.
" 281, *Lamprempis diaphorina* and *benigna*, references should read, Biol. C-Am., Dipt., 1887. p. 215.
" 284, line 7, third word, *read* account.
" 284, second half of first division of table should go to No. 21.
" 288, division 66, second part, read *aerobatica*.
" 290, read *Empis atrifemur*.
" 292, *Empis pegasus*, for Suppl . *read* 1887.
" 335, third line of table, seventh word, *read* three-fourths.
" 339, line 6, *read* **pectiniger.**
" 342, line 13, third word, *read* infallibility.
" 350, table of *Empis*, second line, second word, for ot *read* or.
" " " " third line, *dele* , after mm.
" 351, line 7, last word, *read* evanescent.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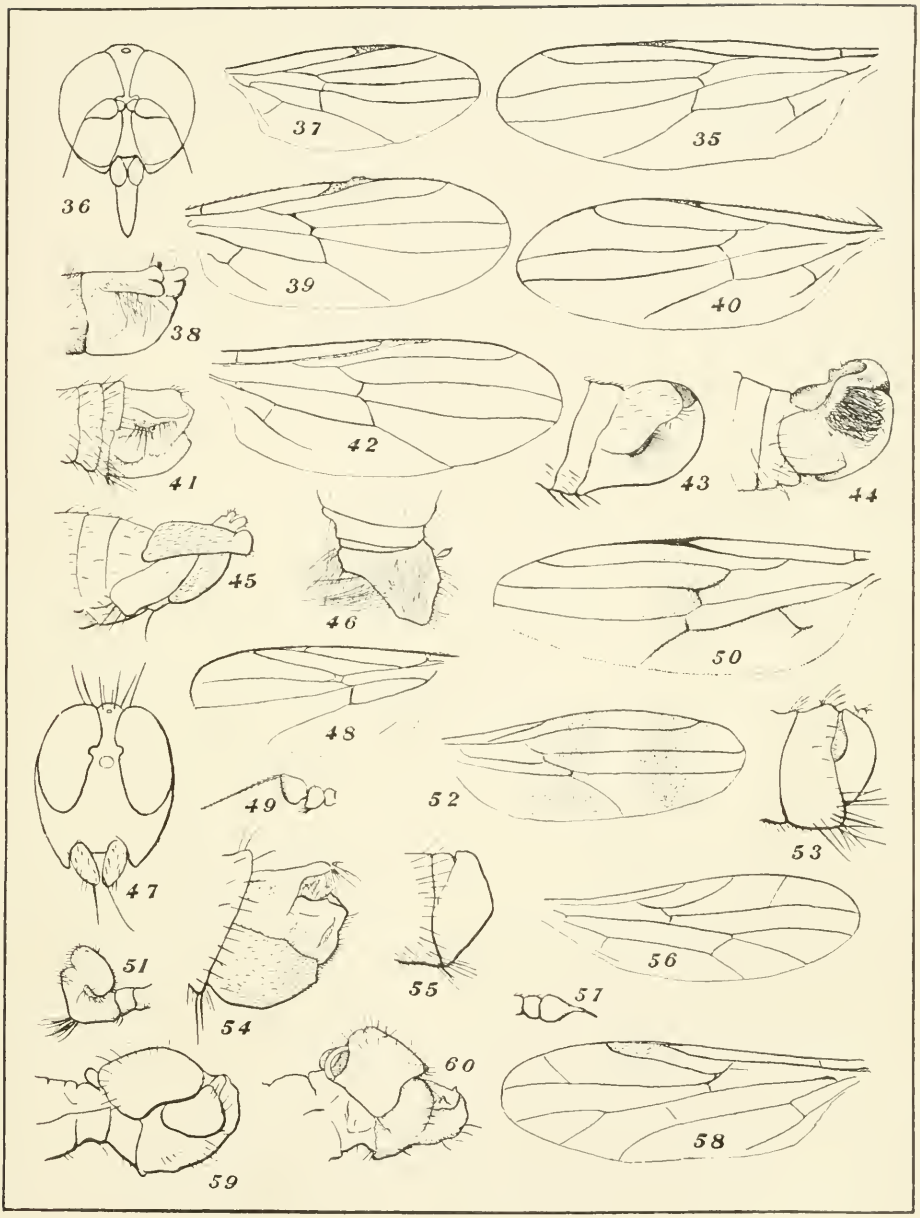
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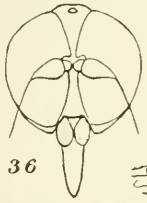
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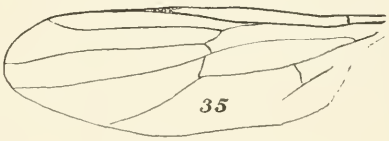
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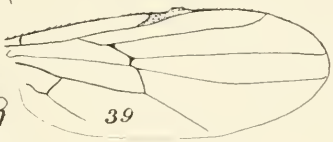
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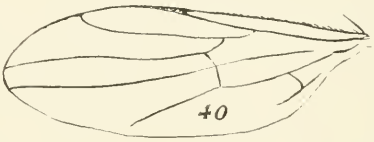
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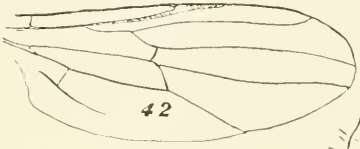
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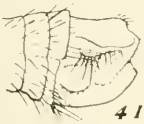
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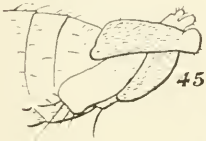
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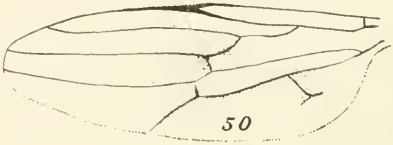
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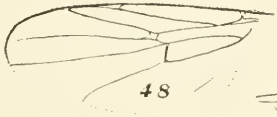
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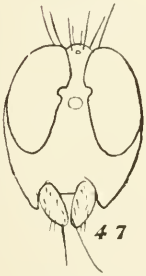
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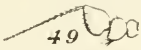
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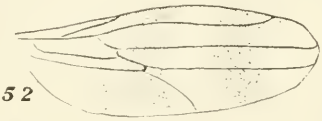
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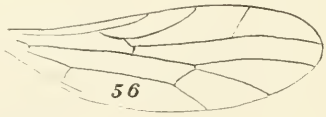
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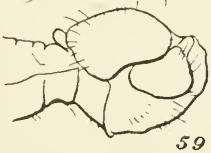
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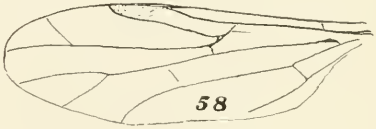
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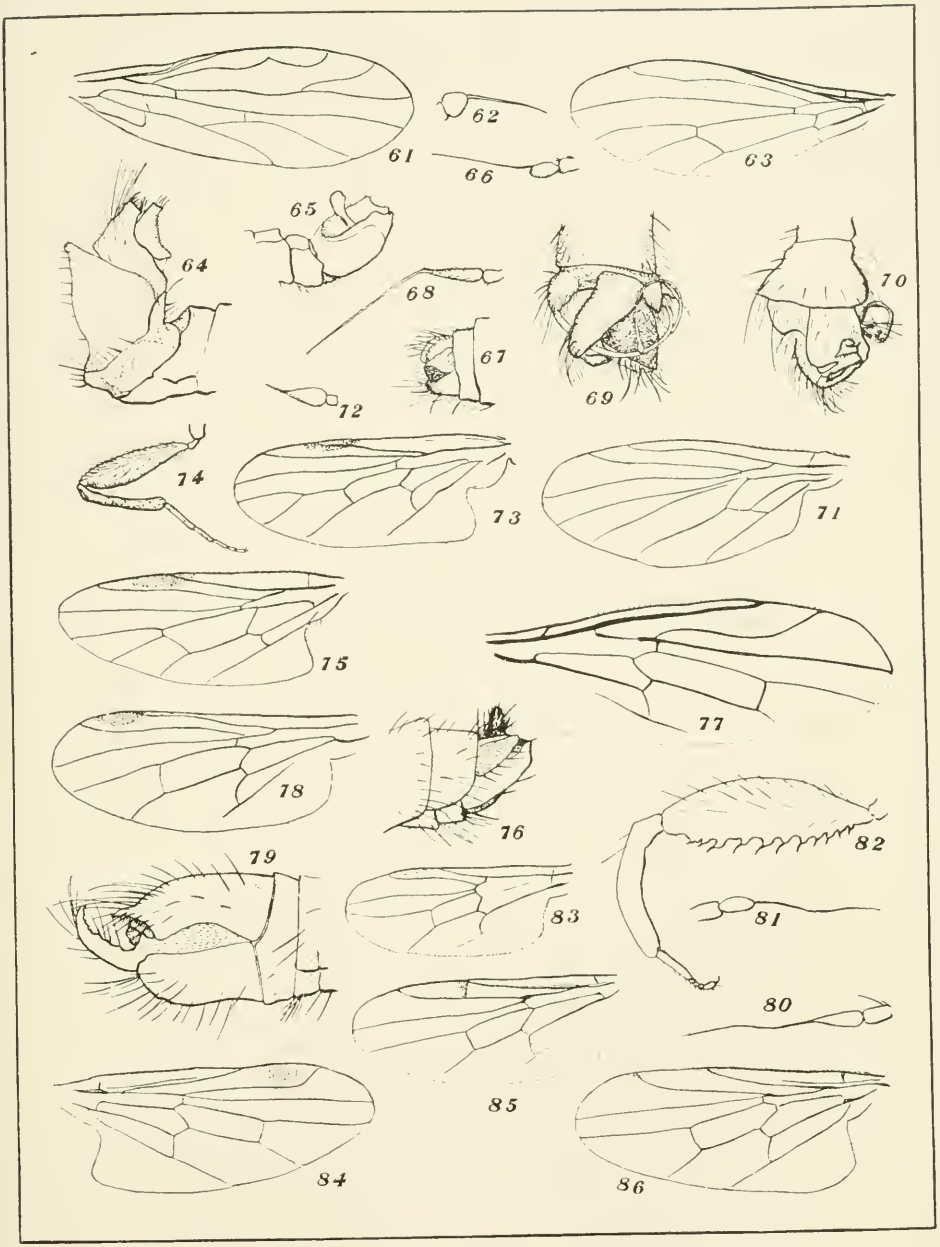
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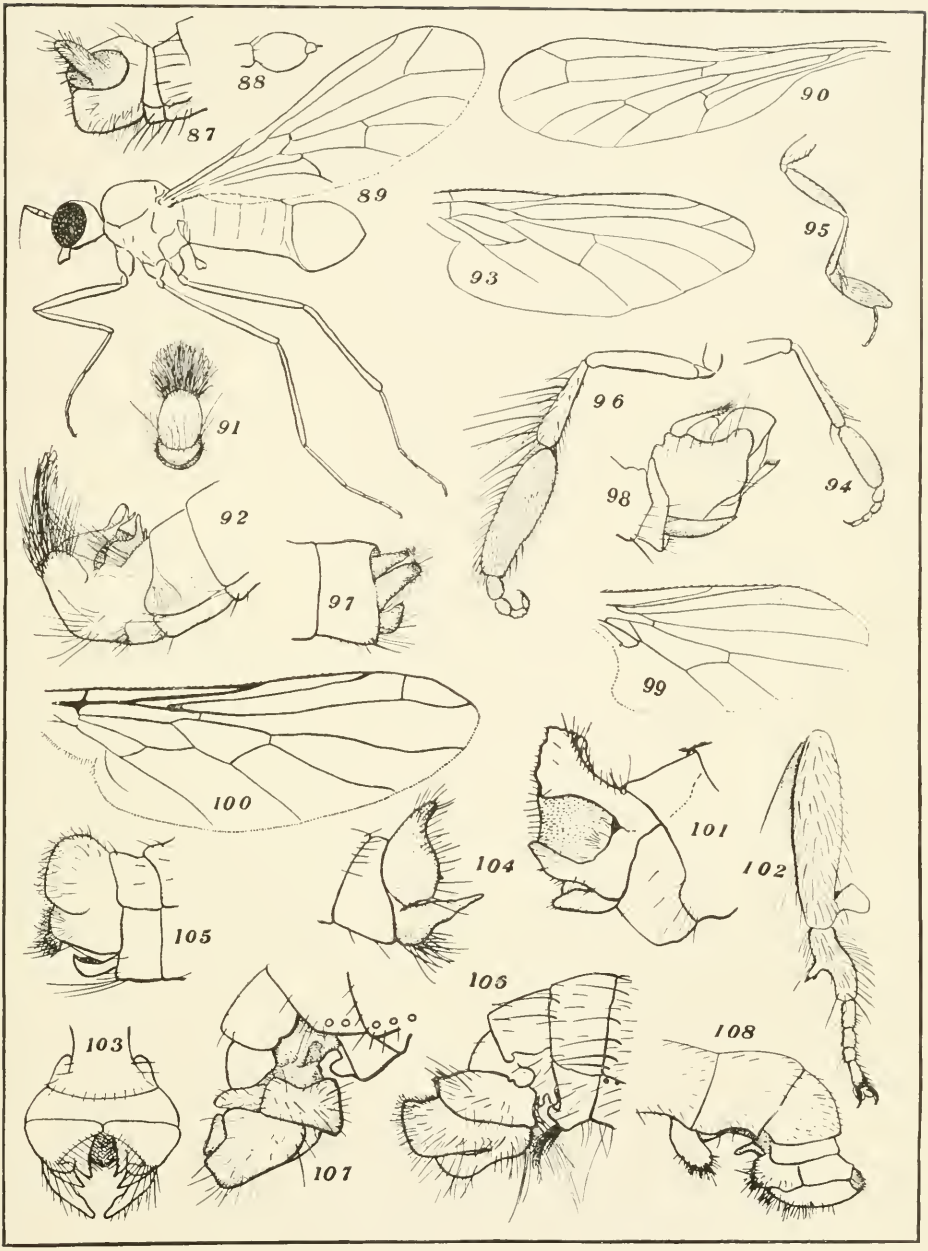
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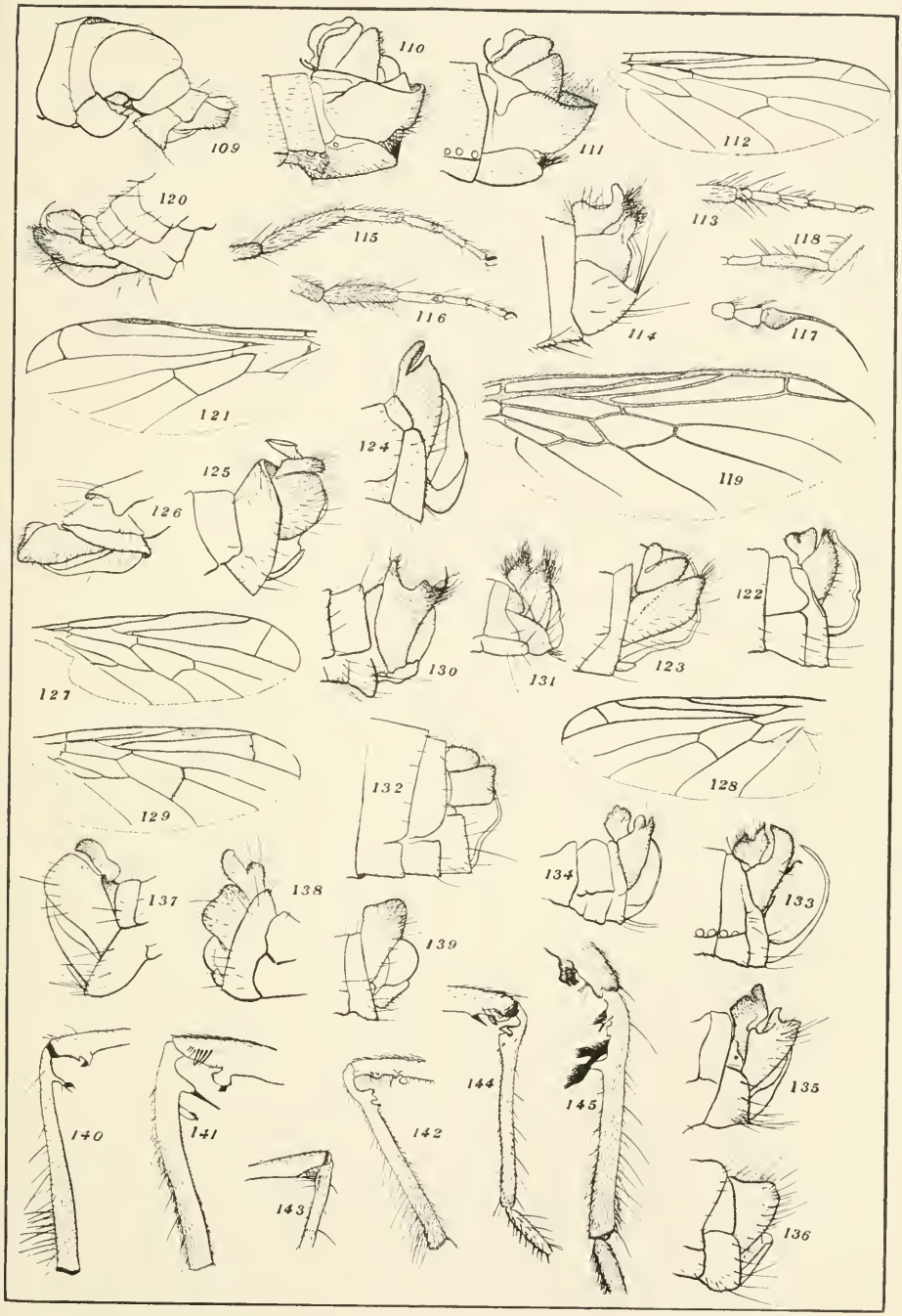
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Descriptions of New Genera and Species of AMERICAN HYMENOPTERA.

BY P. CAMERON.

(New Mills, by Stockport, England.)

ICHNEUMONIDÆ.

MESOSTENINI.

GLODIANUS gen. nov.

Thorax more than three times longer than wide; the parapsidal furrows wide, stoutly transversely striated and extending close to the base of the scutellum. Scutellum roundly convex, its sides not keeled. Median segment, except at the base, distinctly closely transversely striated and with one keel bordering the base of the striated part; the lateral spines are small, but distinct. Wings clear hyaline; the areolet small, closed at the apex; the transverse median nervure in the hind wings is broken well below the middle. The abdominal petiole is long and slender, if anything longer than the 2nd segment and is not much dilated towards the apex, the dilated part not forming a post-petiole; its spiracles are closer to each other than to the apex; the segments are smooth and shining. Metapleural keel extending close to the hinder coxæ.

The eyes are large and parallel; the malar space is small; the front is depressed and is stoutly keeled in the middle; the head is nearly as wide as the mesothorax and is obliquely narrowed behind. The face projects broadly in the middle and is clearly separted from the clypeus by a curved furrow, which ends in the lateral foveæ. The antennæ are long, ringed with white and slightly dilated towards the apex; in the ♂ they are serrate; the 1st joint of the flagellum is longer than the second.

In Ashmead's arrangement of the *Mesostenini*, this genus would come in near *Cryptanura*. 1 Bull. U. S. Museum, xxiii, p. 45.

Glodianus bombycivorus sp. nov

Ferruginous; the abdomen black; the legs of a paler ferruginous color, the hinder femora and tibiæ black, the hinder tarsi white, the extreme base and apex black, the wings clear hyaline; the nervures and stigma black; the antennæ black, the flagellum broadly banded with white in the middle, ♀; ♂ with the abdominal petiole ferruginous. Length 17 ♀; terebra 13 mm.

Scape of antennæ rufous beneath. Face and clypeus yellowish; closely punctured, the two parts separated by a broad semicircular furrow; the face is more strongly punctured than the clypeus. Front chagreened laterally; the central furrow smooth. Mandibles yellowish, their teeth black. The central lobe of the mesonotum is smooth, the lateral apical regions closely and strongly transversely striated. Scutellum and post-scutellum smooth and shining. The base of the median segment is smooth and shining and is raised in the centre; the rest is closely and somewhat strongly transversely striated. Pro- and mesopleuræ smooth; the meta- closely and uniformly striated; the spines are broad and do not project much. The hinder tibiæ are not so deeply black as the femora, which are rufous at the base. Abdomen black, with a bluish tinge; the apices of the segments are pale rufous; the ventral surface, except on the basal segment, pale. The wings are highly iridescent; the recurrent nervure is united with the 2nd transverse cubital. The ♂ has the antennæ serrate and wanting the white band; the metatarsus may be almost entirely black and the petiole may be rufous, wholly or in part.

Hab.—Peru (G. F. Mathew.) Bred from *Bombyx* larva.

CRYPTINI.

MELANOCRYPTUS gen. nov.

Antennæ distinctly dilated towards the apex; the 3rd joint is longer than the 4th. Wings uniformly fuscous-violaceous; the areolet square, the transverse cubital nervures not converging above, the transverse median nervure is received shortly behind the transverse basal; there is no stump of a nervure on the disco-cubital nervure which is roundly curved; the radial cellule narrow, elongate. Median segment long, with two transverse keels and with no lateral teeth; the spiracles are elongate. The keel on the metasternum reaches from the middle to the hinder coxæ. The petiole is long and narrow; the post petiole is not much dilated; the spiracles are placed shortly beyond the middle, as is also the case with those on the 2nd segment; the spiracles on the 2nd segment are placed near the middle; the segments are smooth.

The head is not much developed behind the eyes; the occiput is not much incised; the face is stoutly keeled in the centre, and is separated from the clypeus, which is transverse at the apex; the malar space is moderately large. The parapsidal furrows are almost obsolete; there is a distinct, longitudinally striated furrow at the base of the median segment. The median segment is large, is broadly rounded and is closely coriaceous; the 2nd keel is broadly bent backwards in the middle.

The characteristics of this genus are the long, distinctly dilated antennæ; the longish, not much dilated, petiole; the unicolorous

body and wings, and the almost obsolete parapsidal furrows. In some respects it comes near *Joppoceras*, e. g., in the blackish wings and thickened antennæ. In Ashmead's table it would come in near *Opisoxestus* and *Distemtella*.

Melanocryptus violaceipennis sp. nov.

Black; the anterior tibiæ pale in front; thorax for the most part opaque; the median segment alutaceous, ♀. Length 12; terebra 5 mm.

Face closely punctured, keeled in the centre; the keel becoming smaller at the ends. The depression at the base of the median segment is closely longitudinally striated, and there is a similar striated band on the apex of the metanotum in the centre. The whole segment is coarsely coriaceous, except at the base. The basal keel reaches to the metapleural keel: the second is more distinctly and squarely bent backwards in the middle and does not extend to the sides. The scutellum is roundly convex and is more shining than the mesonotum, and is more widely and distinctly punctured; the apex of the basal depression is irregularly striated. Wings uniformly fuscous-violaceous; the nervures and stigma black. Abdominal petiole smooth and shining; the 2nd and 3rd segments are more opaque; the others have a dull bluish tinge; the segments are narrowly white at the apex.

Hab.—Amazons (Prof. I. W. H. Trail.)

COSMIOCRYPTUS gen. nov.

Antennæ black, ringed with white; the 3rd joint slightly but distinctly longer than the 4th. Median segment broadly and deeply depressed at the base; coarsely reticulated, except at the extreme base, the sides stoutly spined; there are two transverse keels, and in the centre, between them, is a short transverse one united by longitudinal keels to the basal one. Median segment large. Metasternal keel stout, reaching to the coxæ. Wings uniformly deep fuscous violaceous; the areolet large; the radial cellule long and narrow; the disco-cubital nervure with a stump of a nervure; the transverse basal nervure interstitial; the transverse median nervure is broken distinctly below the middle. Metathoracic spiracles elongated oval, of moderate size; the petiolar spiracles are placed close to the base of the post petiole; on the 2nd segment the spiracles are placed in the middle. Abdomen smooth, impunctate.

The head is obliquely narrowed behind the eyes, the malar space is moderately large; the face is roundly convex in the middle; the clypeus is distinctly separated from it and is also roundly convex, its apex is broadly rounded; the labrum is short, but distinct; the legs are normal; the apices of the tarsal joints are spined. The scutellum is roundly convex; the keels do not extend beyond its base;

the basal depression is large, deep, and bears stout keels. The transverse cubital nervures slightly converge above. The petiole commences to become gradually wider from shortly behind the middle.

In Ashmead's arrangement (Bull. U. S. Mus., xxiii, p. 41), this genus would come near *Cryptus* and *Itamoplex*, with neither of which can it be well confounded.

Cosmiocryptus violaceipennis sp. nov.

Black; the 5th to 8th joints of the antennæ white above; the abdomen and the hinder coxæ, trochanters and femora ferruginous; the wings uniformly purple-violaceous, stigma and nervures black, ♀. Length 13; terebra 3 mm.

Antennæ black, slender, slightly more thickened before the apex; the scape shining. The front irregularly transversely striated above; the depressed lower part is more shining and is rather strongly, more widely obliquely striated. Face alutaceous; the clypeus is more shining in the middle and apex where it is sparsely, minutely punctured. Labrum smooth, shining and whitish. Mesonotum closely punctured, more strongly and less closely at the apex than at the base, the parapsidal furrows do not reach to the apex; between them, at their apex, are some stout, irregular keels. In the centre of the scutellar depression are five stout longitudinal keels. The base of the metanotum is longitudinally striated, finely and closely at the base, more widely and strongly towards the keel; the rest is coarsely reticulated; the apical slope more closely and less strongly than the rest; in the middle, at the base, is an area which is wider than long, transverse at the apex, rounded at the base. Pleuræ stoutly, irregularly longitudinaly striated, except the meso- at the apex above and at the base below; the furrow is wide, deep and stoutly striated. The wings have brilliant purple and violaceous reflections; the 2nd transverse cubital and the recurrent nervures are largely bullated. Abdomen smooth and shining.

Hab.—Callao, Peru (I. I. Walker, R. N.).

Callicryptus ornatipennis sp. nov.

Dark ferruginous, the basal 13–14 joints of the antennæ pale yellow, the apical black; the hinder tibiæ blackish, the tarsi pale; wings yellowish-hyaline, a fuscous cloud behind the transverse basal nervure, a similar cloud at the stigma, dilated outwardly in the middle and a wider one on the apex, fuscous; the last two are united by a broad band on the lower side; the nervures and stigma yellowish-testaceous; the hinder wings fuscous at the apex, ♀. Length 13 mm.; terebra 6 mm.

Antennæ stout, shorter than the body; the scape dark ferruginous below. Head shagreened; the face with a microscopic pile; the clypeus sparsely covered with long black hairs. Mandibular teeth black; the palpi dark rufous, thickly covered with pale hair. Pro- and mesothorax shagreened, almost bare. The median segment at the base in the middle distinctly, but not very closely, punctured; the sides more finely and closely punctured; the rest closely, irregularly rugosely punctured. The basal cloud bisects the lower part of the transverse basal nervure and is slightly wider on the lower side; the middle cloud has the upper half oblique and extends to and occupies the areolet; its lower part is roundly curved on the innerside, and is bounded outwardly by the recurrent nervure. The basal 2 segments of the abdomen are darker colored than the apical.

Hab.—Callao, Peru (I. I. Walker).

As I am not sure if this species can be referred to *Callicryptus* (Ashmead, Proc. U.S. Mus., 1900, p. 43), I give here a generic description of it. It certainly appears to be related to "*Cryptus*" *fusco fasciatus* Brulle, from Peru.

Wings yellowish, maculate; the radial cellule elongate; the areolet moderate, the sides parallel, hardly converging above; the transverse median nervure in hind wing broken shortly below the middle. Parapsidal furrows obsolete. The basal keel on the median segment obsolete, but represented by a distinct, transverse, wide furrow; the 2nd keel is indistinct in the middle, more distinct laterally; there are no teeth; the spiracles are elongate. Abdominal petiole longish, the post-petiole not widely dilated; the spiracles are placed near the base of the apical third of the petiole; those on the 2nd segment near the middle. The legs are moderately stout; the tarsi are spineless, their 4th joint is incised deeply; the transverse median nervure in fore wings is received shortly behind the transverse basal. Malar space long. Apex of clypeus transverse, obliquely depressed; the labrum large, rounded at the apex. Antennæ stout, the basal joints of the flagellum rufous; the basal two joints fully four times longer than thick; the 1st, if anything, longer than the 2nd. There is no stump of a nervure on the cubital-disco nervure. The pleural keel on the median segment is distinct.

STILPINI.

JETHSURA gen. nov.

Basal half of mesosternum bordered by a wide, deep, curved furrow. Median segment indistinctly areolated at the base, the three apical areæ are distinct; the base of the segment is slightly depressed, the spiracles small, indistinct, longer than broad. Antennæ short, thick, dilated beyond the middle, the basal joints of the flagellum distinctly longer than broad. Temples large, the occiput roundly incised. Malar space moderately large. Face roundly dilated in the centre and separated from the clypeus, which has its apex rounded. Labrum hidden. Mandibles with a large upper and a minute lower tooth. Scutellum flat. The median segment, at the apex on either side, bears a leaf like expansion. The meta-pleural keel is indistinct; on the lower part is a wide furrow bearing some keels on the apex. Areolet 5 angled, narrowed on the top, the cubital nervure is obsolete beyond it; the transverse basal nervure is interstitial; the stigma is large, obliquely narrowed towards the middle, on both sides below. Wings short, not reaching beyond the apex of the 4th abdominal segment. Legs short, stout, the apex of the hinder femora hardly reaching to the apex of the 3rd abdominal segment. Petiole long, rather slender, becoming gradually widened from the middle

to the apex; the spiracles are placed half way between the middle and apex. Gastracoeli indistinct. The abdomen is twice the length of the thorax; the 2nd and 3rd segments are closely but not strongly punctured; there are 7 segments; the last is large, two-thirds of the length of the preceding and is equally developed above and below; the ventral keel is largely developed on the 2nd, 3rd and 4th segments. The valves of the ovipositor are short and broad.

Seen from the side the median segment is broadly rounded from the base to the apex, the centre being broadly raised; it is more than half the length of the mesothorax; the petiole viewed laterally is broadly curved upwards; the abdominal segments are all longer than broad and are distinctly separated; they are not compressed laterally; the petiole is distinctly longer than the hind coxæ and trochanters; the areolet is distinctly closed; the apical nervures in the hind wings are obsolete; the antennæ have over 30 joints.

Belongs to the *Stilpnini*, but cannot be well confounded with any known genus in that group. The long abdomen and the short wings are characteristic.

Jethsura ferruginea sp. nov.

Ferruginous, the edges of the median segment black; the flagellum of the antennæ black, banded with white in the middle; the wings hyaline; the stigma and nervures fuscous, ♀. Length 8; wing expansion 12 mm.

Scape of antennæ rufous; the basal joints of the flagellum dark rufous; the 8 14 joints white, Vertex almost smooth; the frontal depression closely transversely striated; the face and base of clypeus punctured. Mandibular teeth black. Prothorax closely punctured; the propleuræ irregularly striated at the apex. Mesonotum closely and distinctly punctured. Scutellum smooth, its sides yellowish. Median segment closely and rather strongly punctured; there are 3 areæ on the apical slope; the central is broadly rounded above; the lateral are lanceolate above. Meso- and metapleuræ closely and distinctly punctured. Wings clear hyaline. Abdomen smooth and shining; the 2nd, 3rd and 4th segments minutely punctured. Legs, if anything, paler in tint than the body; the hinder femora are not much longer than the coxæ and trochanters united.

Hab.—New Mexico.

SPHEGIDÆ.

Alyson petiolatus sp. nov.

Length 5 mm, ♂.—Head black; face, clypeus, the part between the antennæ the mandibles and the inner orbits to near the middle of the eyes, yellow. The front closely and minutely punctured; the centre with a shallow furrow; the vertex is almost impunctate, The scape is yellow below; the flagellum is brownish; the 3rd joint is nearly as long as the 4th; the incision on the apical joint is rather slight. The thorax towards the apex has a faint bluish tinge; there are two lines on the centre of the pronotum and one near the tegulæ, and there are two large marks, narrowed on the inner side, on the base of the scutellum. Meso-

notum closely and distinctly punctured. The area on the median segment is triangular, but longer than the width of the base; there are 4 oblique keels, the inner reaching to shortly beyond the middle; the apex of the area is shagreened; from the area 4 longish keels run to the sides, and there are also 4 or 5 keels on the top of the pleuræ on the basal part. On the meso-pleuræ is a wide, not very deep, oblique furrow; the part above this is raised. The four front coxæ, the femora below and the tibiæ and tarsi are for the greater part testaceous as is also the greater part of the hinder tarsi; the basal third of the hinder tibiæ is white; the femoral tooth is small, but distinct. The pedicle of the 2nd cubital cellule is longer than usual, being nearly as long as the 2nd transvere cubital nervure and as long as the top of the 2nd cubital cellule; the 1st recurrent nervure is received distinctly in front of the 1st; the 2nd at a greater distance in front of the 2nd transverse cubital nervure. Abdomen smooth; the marks are large, wider than long and irregularly oval. The last joint of the antennæ is less curved and the pedicle of the 2nd cubital cellule longer than usual.

Hab.—Santa Fé district New Mexico.

This species may be separated from *A. interstitialis* as follows:

Base of scutellum with 2 yellow marks; the area on median segment with 4 oblique keels; the 2nd recurrent nervure received distinctly beyond the 2nd transverse cubital.....**petiolatus.**

Base of scutellum without yellow marks; the area on median segment with 2 oblique keels; the 2nd recurrent nervure joined to the 2nd transverse cubital .....**interstitialis.**

Alyson interstitialis sp. nov.

Black; the lower half of the inner orbits, the clypeus and labrum, the mandibles, the short lines on the centre of the pronotum, a broader one close to the tegulæ, the four anterior femora and tibiæ in front, the front tarsi and the base of the hinder tibiæ, pale yellow; the wings clear hyaline; the nervures and stigma black, ♂. Length nearly 5 mm.

Antennæ stout, covered with a dense microscopic pile, the scape yellow, the flagellum pale fulvous beneath; the last joint is thinner than the preceding and is as long as it; the curve on the lower side extends from the base to the apex The front and clypeus are covered with silvery pubescence; the front is less shining than the vertex. Mandibles yellow, blackish at the apex. Thorax shining; the upper part sparsely covered with pale pubescence; the area on the median segment is longer than the width at the base; the two keels unite at the apex and there are two oblique keels at the base on the inner side, which form two somewhat triangular areæ; there are three or four short irregular keels attached to the outerside of the lateral keels. Abdomen shining, the segments thickly fringed with long pale hair; the marks on the 2nd segment are transverse, somewhat pyriform in shape and bright lemon yellow in color. The four front tarsi are for the greater part testaceous; the hinder pair are testaceous at the base of the joints only. The apical slope of the median segment is finely punctured as seen through a good lens, and is stoutly keeled down the centre; the scutellar depression bears stout keels; the two recurrent nervures are interstitial, there is no distinct oblique furrow on the mesopleuræ; the last segment is

broad, not much narrowed towards the apex; the 3rd joint of the antennæ is distinctly shorter than the 4th; the apex of the clypeus is transverse, the sides rounded; the four anterior coxæ and trochanters are for the greater part yellow.

Hab.—Santa Fé district, New Mexico.

In Handlirsch's Monograph (Sitz. der Kaiserl. Akad. der Wissen. in Wien, civ, p. 37), this species would come in near *A. triangulifer*, but it cannot well be confounded with that species.

APIDÆ.

Nomia tacita sp. nov.

Black; the scutellum, the apical half of the mesopleuræ, the median segment, the basal abdominal segment, the base of the 2nd broadly and the 4th and 5th more narrowly, bright metallic green; the hinder trochanters with a large stout tooth beneath; the hinder femora with an oblique sharp tooth near the apex and with a minute one between it and the apex; the antennal joints dilated beneath; the clypeus is for the greater part white, ♂. Length 13 mm.

Antennæ black; the basal 5 joints rufous beneath; the 4th to the 11th joints are dilated roundly below and depressed roundly above; the last joint is narrowed at the base and becomes gradually, but not much, narrowed towards the apex; it is slightly longer than preceding. Head black; the face and outer orbits metallic green, and thickly covered with long pale fulvous hair; the clypeus and the mandibles, except at the apex, pale yellow. Eyes large, slightly, but distinctly, converging below and thickly covered with dark fulvous pubescence. Thorax thickly covered with long pale fulvous hair; the scutellum, the apical half of the mesopleuræ and the median segment bright emerald green; the area on the median segment is stoutly, irregularly reticulated; the apical slope is closely, irregularly punctured; metapleuræ closely, distinctly and finely punctured. The four front femora and tibiæ and the front tarsi are rufo-fulvous; femora and middle tibiæ lined with black behind; the hinder legs are entirely black; the trochanters project below into a broad plate-like tooth, which becomes gradually narrowed from the top to the bottom, the latter being rounded; the hinder femora are thickened, thicker at the apex than at the base; the tooth is sharply pointed and about twice the length of the base; the tibiæ are stout, but not much thickened towards the apex; the metatarsus is stout and, on the upper side, beyond the middle is produced into a stout tooth, which, above, becomes gradually roundly narrowed towards the apex; below it is straight; the apical 3 joints are rufous; all legs are thickly covered with pale fulvous pubescence. Wings hyaline, the apex infuscated; the stigma testaceous, the nervures darker in color. The abdomen is sparsely covered with pale pubescence with longer black pubescence on the apical half of the 1st segment; the 2nd, 3rd and 4th segments are depressed at the base; the last segment, in the middle, projects into a broad rounded lobe.

Hab.—Santa Fé district, New Mexico.

Nomia cillaba sp. nov.

Metallic bright green, mixed with blue; the apex of the clypeus, the labrum, the mandibles, except at the apex, and the greater part of the legs, fulvous-yellow; the wings hyaline; the head and thorax thickly covered with long pale hair, ♂.

Antennæ black, brownish beneath. Head closely and distinctly punctured; the green largely mixed with blue, the inner orbits purple. The front and vertex and the upper part of the face are thickly covered with long pale fulvous hair. The yellow apex of the clypeus and the labrum are only sparsely punctured. The green of the thorax is largely mixed with blue and brassy tints, and is closely, uniformly and distinctly punctured; the hair on it is long, moderately thick and pale fulvous in color; the area on the median segment is irregularly longitudinally striated. Legs fulvous-yellow; the upper part of the coxæ, trochanters and femora largely marked with metallic green color; on the hinder femora this color extends on to the apical two-thirds. The hinder femora are greatly swollen, and are irregularly oval in shape; the base on the lower side is straight and oblique, not rounded. The hinder tibiæ become gradually thickened to near the apex, which is thicker than the base; the metatarsus is greatly thickened throughout, and is longer than the other joints united. The middle segments of the abdomen are broadly depressed at the base; all the segments are smooth and narrowly banded with lead-colored bands at the apex; the pygidium is dark fulvous, widest in the middle, and obliquely narrowed from there to the base and apex; the basal portion is longer and somewhat narrower than the apical; the last segment is depressed round the edges and keeled broadly down the middle on the ventral surface.

Hab.—Santa Fé district, New Mexico.

Epeolus fulvo-pilosus sp. nov.

Black; the scutellum and base of the antennæ ferruginous, the apical half of the 2nd and the whole of the following segments covered with a bright fulvous pile; the wings highly iridescent, infuscated; the stigma fulvous, the nervures black, ♂. Length 8 mm.

Antennæ black; the basal three joints entirely bright rufous; the 4th to 8th dark rufous beneath. Head closely and distinctly punctured; the front and face thickly covered with fulvous pubescence; the clypeus more sparsely with paler and shorter pubescence. There is a rufous mark on the sides of the labrum above; the mandibles are rufous, except at the base and apex. Pro- and mesothorax closely rugosely punctured; the pronotum is thickly covered with fulvous pubescence, as are also the sides and apex of the mesonotum and probably also part of the central region. Scutellum coarsely, irregularly reticulated; the centre at the apex bilobate; the lateral teeth long. The base of the median segment has a band of fulvous pubescence; its sculpture is fine and close. Mesopleuræ closely rugosely reticulated; the metapleuræ aciculated. Legs black; the knees, the 4 front tibiæ and all the tarsi testaceous; the hinder are testaceous, blackish behind. The 2nd and 3rd cubital cellules at the top are almost equal in length, as they are also at the bottom; the 1st recurrent nervure is received at the base of the apical third, the 2nd at the base of the apical 4th of the cellule. The basal half of the abdomen is black; the apical entirely fulvous through the thick covering of bright fulvous pubescence; the last ventral segment is broadly rounded and is produced distinctly beyond the dorsal, which has its apex broadly rounded.

Hab.—West Coast of Mexico (G. F. Mathew).

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